



US005794219A

**United States Patent** [19]  
**Brown**

[11] **Patent Number:** **5,794,219**  
[45] **Date of Patent:** **Aug. 11, 1998**

[54] **METHOD OF CONDUCTING AN ON-LINE AUCTION WITH BID POOLING**

[75] **Inventor:** **Stephen J. Brown**, Mountain View, Calif.

[73] **Assignee:** **Health Hero Network, Inc.**, Mountain View, Calif.

[21] **Appl. No.:** **603,131**

[22] **Filed:** **Feb. 20, 1996**

[51] **Int. Cl.<sup>6</sup>** ..... **G06F 17/60**

[52] **U.S. Cl.** ..... **705/37; 705/26; 705/27; 705/39**

[58] **Field of Search** ..... **705/1, 26, 27, 705/35, 37, 38, 39, 44; 395/200.47, 200.49, 200.57; 340/825.26, 825.27, 825.3, 825.31, 825.33**

[56] **References Cited**

#### U.S. PATENT DOCUMENTS

3,581,072	5/1971	Nymeyer .....	705/37
4,412,287	10/1983	Braddock, III .....	705/37
4,789,928	12/1988	Fujisaki .....	705/37
4,799,156	1/1989	Shavit et al. ....	705/26
4,903,201	2/1990	Wagner .....	705/37
5,077,665	12/1991	Silverman et al. ....	705/37
5,243,515	9/1993	Lee .....	705/37
5,640,569	6/1997	Miller et al. ....	395/729
5,689,652	11/1997	Lupien et al. ....	705/37

#### OTHER PUBLICATIONS

Franklin; "Proposed Auction Rules for PCS: The FCC Plans to Use Competitive Bidding, but Exact Procedures are Undefined"; *Cellular Business*; v10 n13; p.18(2); Dec. 1993; DIALOG: File 148, Acc#06787310.  
O'Donnell; "Alan's At It Again"; *Bond Buyer*; v309 n29448; p.1(3); Jul. 21, 1994; DIALOG: File 148, Acc#07478152.  
Gordon; "Auctions Become High Tech"; *Dealer Business*; v29 n7; p.21(4); Mar. 1995; DIALOG: File 148, Acc#07862519.

Dialog Abstract: File 610, Acc#0489267; "ONSALE Onsale Brings Thrill of Auctions and Bargain Hunting Online; Unique Internet retail service debuts with week-long charity auction for The Computer Museum in Boston". May 24, 1995.

"Onsale Joins Fray as Online Shopping Picks Up Speed: INTERNET BOOMS"; *Computer Reseller News*; Jun. 5, 1995; p. 73; DIALOG: File 16, Acc#05649796.

"Cathay Pacific Airways—USA to Hold First—Ever Internet CyberAuction; CyberTravelers Can Bid for 50 Business Class Round Trips to Hong Kong—No Minimum Bid"; *Business Wire*; p9261084; Sep. 26, 1995; DIALOG: File 148, Acc#08167091.

Siegmann; "Nowhere to Go but Up"; *PC Week*; v12 n42, p.A5(1); Oct. 23, 1995; DIALOG: File 148, Acc#08222496.

Edelson; "Fashion Reevaluates Flickering Fortunes of TV Home Shopping"; *WWD*; v170 n87; p1(3); Nov. 8, 1995; DIALOG: File 148, Acc#08289119.

*Primary Examiner*—Stephen Tkacs

*Attorney, Agent, or Firm*—Luhm Intellectual Property Services

[57]

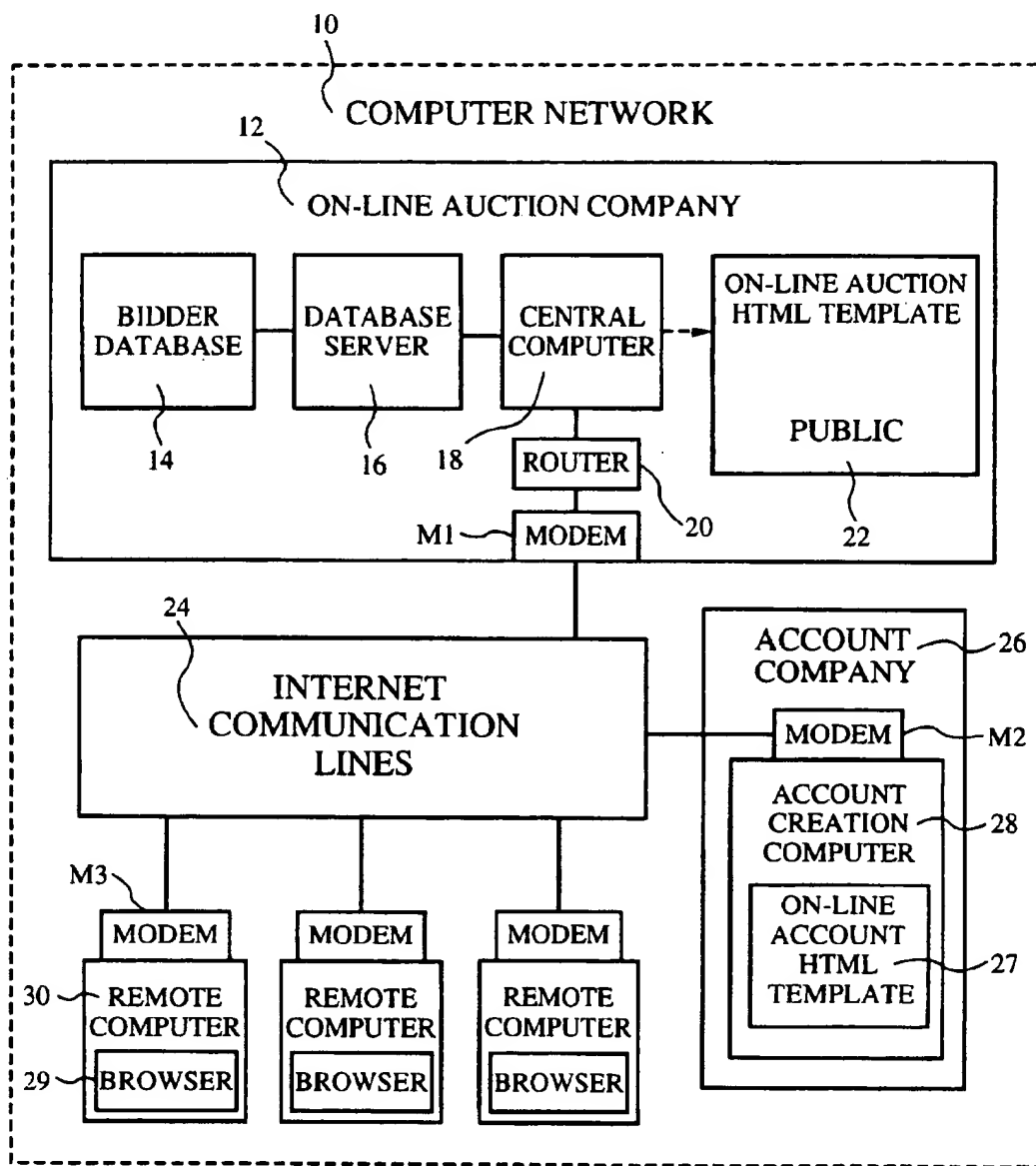
#### ABSTRACT

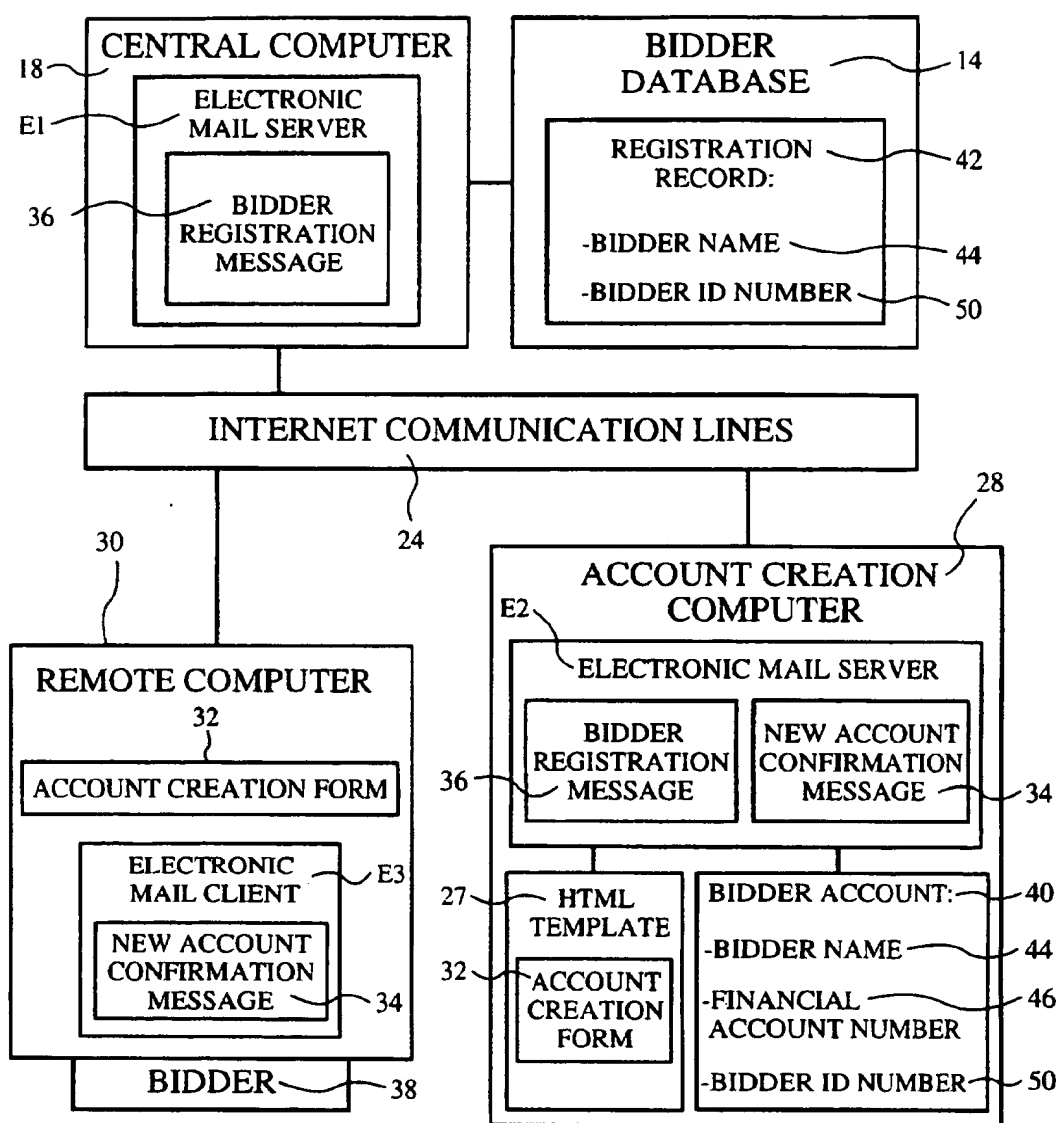
A method of conducting an on-line auction that permits individual bidders to pool bids during a bidding session. The auction is conducted over a computer network that includes a central computer, a number of remote computers, and communication lines connecting the remote computers to the central computer. A number of bidding groups are registered in the central computer, each bidding group having a total bid for the item being auctioned. Bids entered from the remote computers are received in the central computer, each bid including a bid amount and a bid designation. Each bid amount is contributed to the total bid of the bidding group indicated by the bid designation. The bidding group having the largest total bid at the end of the bidding session wins the item being auctioned.

**20 Claims, 7 Drawing Sheets**

The diagram shows a "BID ENTRY FORM" (76) with the following sections and fields:

- CURRENT ITEM:** Includes a field for "GRAPHICAL PICTURE" (72) and a "DESCRIPTION" field (73).
- SELECT ONE BIDDING GROUP:** Contains three boxes:
  - NEW YORK ART MUSEUM:** Includes a "TOTAL BID" field (78).
  - LOS ANGELES MUSEUM OF ART:** Includes a "TOTAL BID" field.
  - ROMAN CATHOLIC CHURCH:** Includes a "TOTAL BID" field.
- BIDDER INFORMATION:** Includes fields for:
  - BIDDER NAME:** "JOHN SMITH" (57).
  - BIDDER ID NUMBER:** "45132" (58).
  - BID AMOUNT:** "\$500.00" (59).
  - BID DESIGNATION:** "NEW YORK ART MUSEUM" (60).
- Buttons:** "ENTER BID" (79) and "CREATE ACCOUNT" (80).

**FIG. 1**

**FIG. 2**

32

ACCOUNT CREATION FORM

BIDDER NAME: 44 JOHN SMITH 54

FINANCIAL ACCOUNT NUMBER: 46 5423 6789 8976 4543

FINANCIAL ACCOUNT TYPE: 48 CREDIT CARD

52

SEND ACCOUNT INFORMATION

56

BIDDER IDENTIFICATION NUMBER WILL BE ASSIGNED IN A NEW ACCOUNT CONFIRMATION MESSAGE

**FIG. 3**

34

NEW ACCOUNT CONFIRMATION MESSAGE

44 BIDDER NAME: JOHN SMITH 55

46 FINANCIAL ACCOUNT NUMBER: 5423 6789 8976 4543

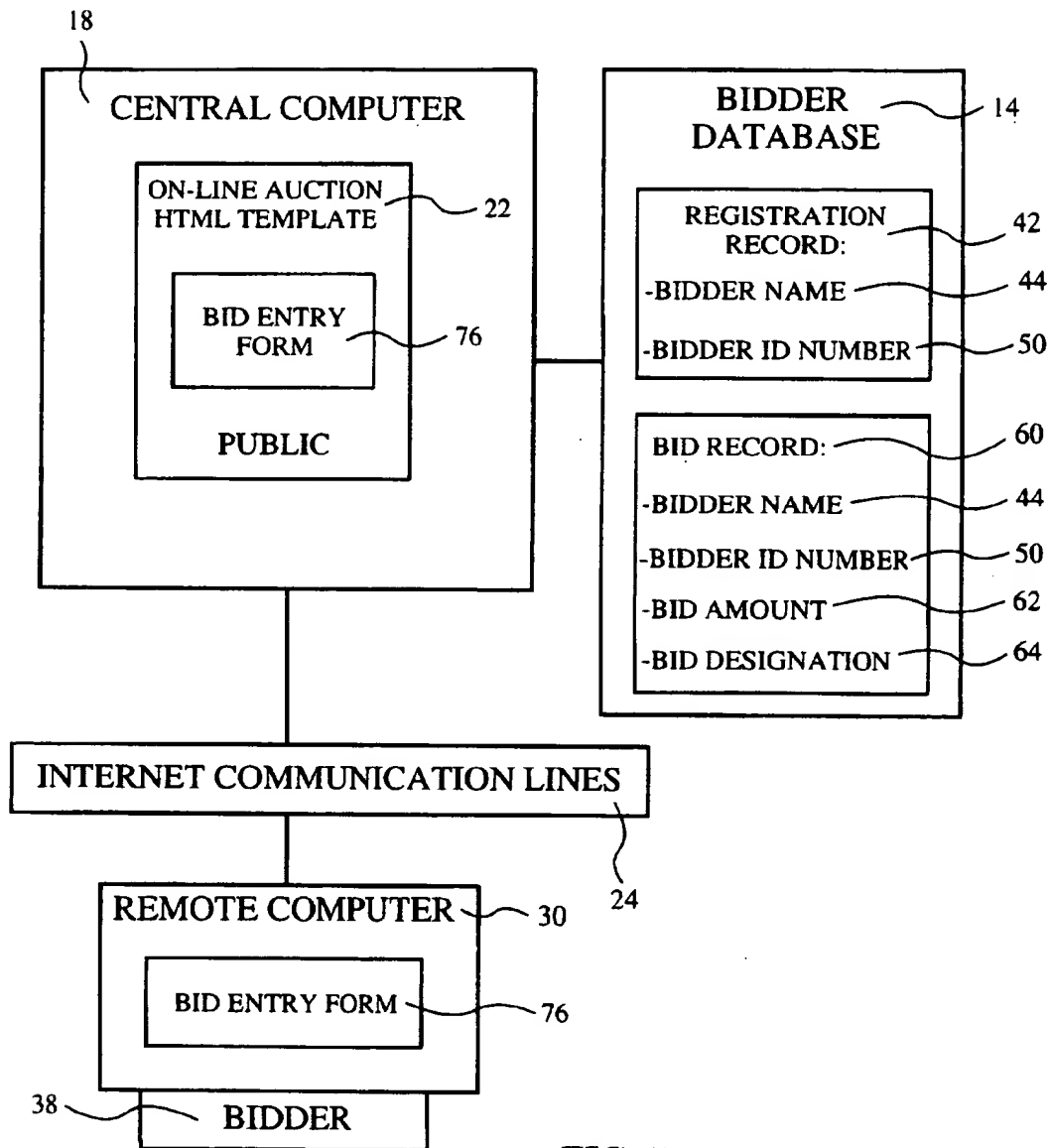
48 FINANCIAL ACCOUNT TYPE: CREDIT CARD

50 BIDDER ID NUMBER: 431532

58

PLEASE CONFIRM YOUR NEW ACCOUNT INFORMATION WITH YOUR ACCOUNT COMPANY

**FIG. 4**

**FIG. 5**

76  
**BID ENTRY FORM**

70  
CURRENT ITEM:    -GRAPHICAL PICTURE ~ 72  
                     - DESCRIPTION ~ 74

SELECT ONE BIDDING GROUP

66

NEW YORK ART MUSEUM	LOS ANGELES MUSEUM OF ART	ROMAN CATHOLIC CHURCH
- TOTAL BID	- TOTAL BID	- TOTAL BID

68

44 BIDDER NAME:    JOHN SMITH 57

50 BIDDER ID NUMBER:    431532

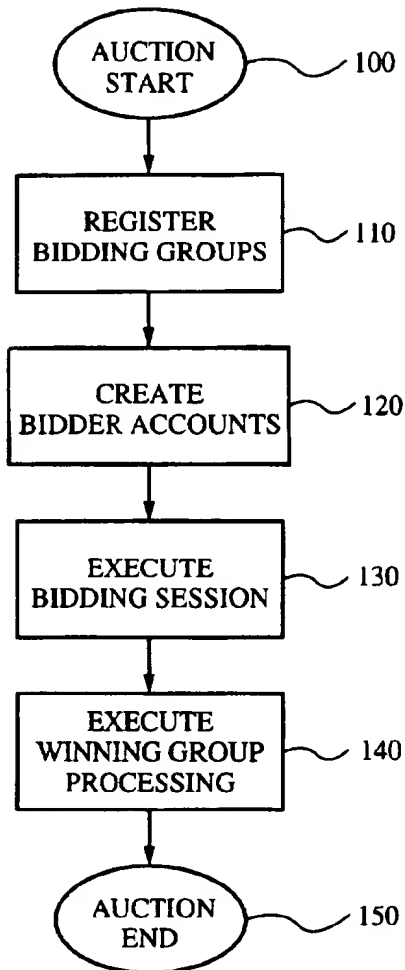
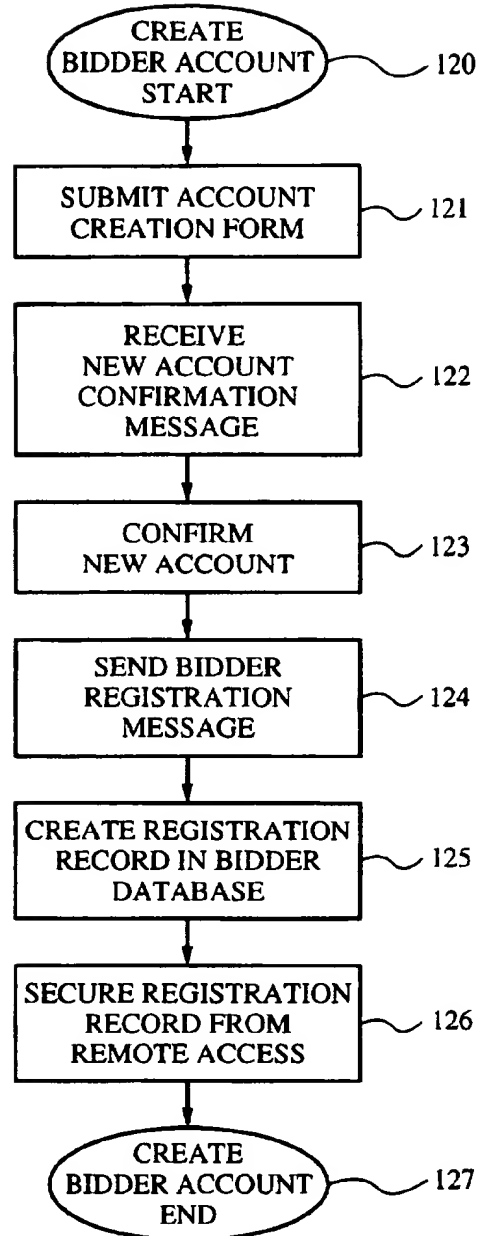
62 BID AMOUNT:    \$500.00

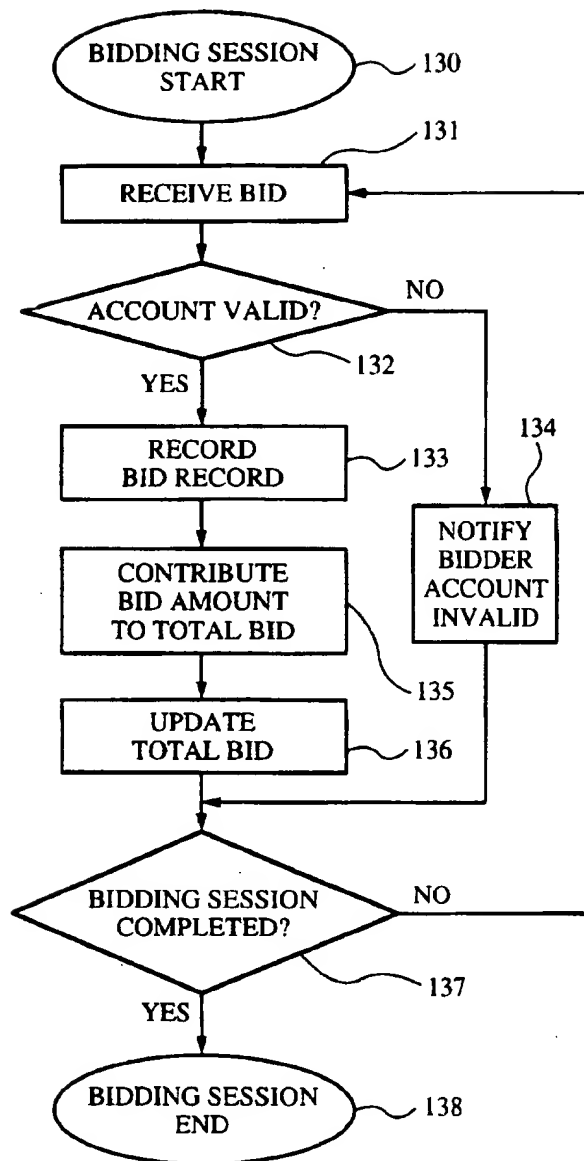
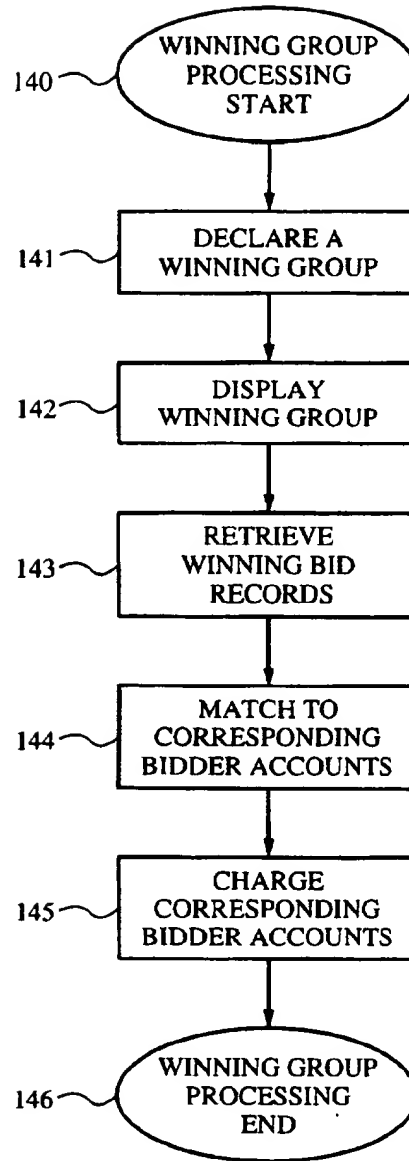
64 BID DESIGNATION:    NEW YORK ART MUSEUM

ENTER BID 78

CREATE ACCOUNT 80

**FIG. 6**

**FIG. 7****FIG. 8**

**FIG. 9****FIG. 10**



## METHOD OF CONDUCTING AN ON-LINE AUCTION WITH BID POOLING

### BACKGROUND

#### 1. Field of the Invention

The present invention relates to the field of conducting on-line auctions using a computer network, and in particular to a method of conducting an on-line auction that allows individual bidders to pool their bids in real-time during a bidding session.

#### 2. Description of the Prior Art

Auctions provide a popular and exciting marketplace for the buying and selling of property. In particular, auctions are often used to sell highly valued property such as fine art, collectibles, real estate, and luxury items. Traditionally, participation in these high stakes auctions has been exclusively reserved for the extremely wealthy. Many ordinary individuals who would like to participate in the excitement of a high stakes auction are denied access for two reasons.

The first reason is that individual bidders are usually required to attend an auction in person to place a bid on an item for sale. This requirement limits participation in the auction to those people who live near the auction site or those people who can afford the time and expense to travel to the auction site. The second reason is that bidders are required to have sufficient funds to pay for a sale item should they place the winning bid. Because very few people can afford the price of a piece of fine art, bidding is limited to extremely wealthy individuals or to organizations who have raised sufficient funds to pay for a winning bid before the bidding session has begun. Both of these restrictions must be overcome before participation in high stakes auctions can become more widespread.

Many attempts have been made to solve the first problem, gaining bid access to an auction without having to be physically present at an auction site. For example, U.S. Pat. No. 4,789,928 issued to Fujisaki on Dec. 6, 1988 describes an auction information processing system which enables individuals spread over a wide area to participate in an on-line auction. The system includes a host computer connected via communication lines to many remote terminals of individual bidders. The individual bidders enter bids from their remote terminals and the current highest bid and eventual winning bid are displayed in real-time on the remote terminals.

While this system has the advantage of allowing a large number of individual bidders to participate in an on-line auction, it has the disadvantage of not allowing individuals to pool their bids during a bidding session. To win an auction, each bidder must personally have sufficient funds to cover a winning bid. Thus, although this system solves the first problem restricting auction participation, it still limits participation to those individuals who can personally afford the entire purchase price of the item for sale.

Another computerized bidding system is disclosed in U.S. Pat. No. 4,903,201 issued to Wagner on Feb. 20, 1990. Wagner describes an automated futures trading exchange wherein bids to purchase or offers to sell a particular commodity contract are made by exchange members through remote terminals connected to an exchange computer. The exchange computer matches offer, prices and bid prices to complete trading transactions. This system described by Wagner suffers from the same disadvantage of not allowing bidders to pool their bids to buy an item for sale. Additionally, bidders are limited to exchange members, so that the ordinary public is excluded from participating.

Another system for conducting a competitive bidding procedure is disclosed in U.S. Pat. No. 5,243,515 issued to Lee on Sep. 7, 1993. Lee describes a secure teleprocessing bidding system for enabling construction subcontractors to submit bids to a general contractor for a particular construction job. Subcontractors use an ordinary telephone to dial into a central bidding computer and enter their bids. At the close of the bidding session, the central computer prints a summary report of all bids received, and the summary report is mailed or faxed to all participating bidders. As in the previous bidding systems, this system has no mechanism for allowing bidders to pool their bids. Additionally this system suffers from the added disadvantage of not displaying bid information in real-time for bidders to read during a bidding session.

Another teleprocessing system used by QVC Incorporated is described in an article entitled "Fashion Re-Evaluates Flickering Fortunes of TV Home Shopping", WWD, Nov. 8, 1995 V170 N87. Shoppers call from their home phones to order items advertised on their television screens. As the orders are received, QVC tallies how many people have bought each particular sale item. They then display the tally for each item on the viewers, television screens in real-time. This interactive television method of buying an item provides easy remote access to a sale and real-time feedback to buyers. While this method does allow wide audience participation, buyers are not permitted to pool their money to buy an item, so that the sale is limited to relatively low cost items.

Another use of television to sell items is described in an article entitled "Auctions Become High Tech", Dealer Business, Mar. 1995 V29 N7. The article describes an auction system in which an auction company sends a signal via satellite to the televisions of individual car dealers. The dealers view the car for sale on their televisions and bid on the car using a telephone or a remote terminal. Like the previous on-line auction systems, this system offers no mechanism for dealers to pool their bids. Individual bidders must still cover the entire cost of items purchased.

In addition to the on-line auctions mentioned above, several on-line auctions are now being conducted over the Internet. One such auction is described in an article entitled "Cathay Pacific Airways-USA to Hold First Ever Internet CyberAuction" Business Wire, Sep. 26, 1995 p9261084. The article states that Cathay Pacific is auctioning off fifty business class seats from Los Angeles to Hong Kong. Registered bidders submit concealed bids by electronic mail over a two week bidding session. The fifty highest bidders at the close of the bidding session receive an electronic mail message instructing them on how to purchase tickets. This auction system suffers from the same disadvantages of not allowing bid pooling during the bidding session and not displaying bid information to bidders in real-time.

Similarly, Save the Earth Foundation has an Artrock Auction that is described at their world-wide web site [http://www.commerce.com/save\\_earth](http://www.commerce.com/save_earth). To participate in the auction, bidders register and submit bids for auction items through the Internet. Bidders are notified by electronic mail when a bid higher than their own is placed on an item. The winning bidder is also contacted by electronic mail at the close of the bidding session. As in the Cathay Pacific auction, the Artrock Auction has no mechanism to allow bid pooling or to display bid information in real-time.

Auction Web also has on-line auctions, as described at their world-wide web site <http://www.ebay.com>. In this auction system, bidders also register and submit bids

through the Internet. Items for sale are graphically displayed on the bidders' screens, in addition to the bid information for each item. Bid information is updated hourly throughout each two week bidding session. Unfortunately, like the previously mentioned on-line auctions, Auction Web's auction has no mechanism for allowing individual bidders to pool their bids for a particular item during the bidding session.

Similarly, Christie's International describes "Results of the World's First On-Line Auction" at their world-wide web site <http://www.christies.com>. In Christie's auction, bidders register and submit bids in the same manner as the Auction Web auction. Christie's on-line auction also suffers from the same disadvantage as the Auction Web auction in that it has no mechanism to allow bid pooling by individual bidders during a bidding session.

Thus, no existing on-line auction enables individual bidders to pool their bids during a bidding session. All of the current on-line auctions require each bidder to have sufficient funds to cover a winning bid, severely restricting the number of people who can participate in a high stakes auction. Additionally, not all of the on-line auctions enable bidders to view bid information in real-time, further limiting the excitement of the auction for those few who can afford to participate.

#### OBJECTS AND ADVANTAGES OF THE INVENTION

Accordingly, it is an object of the present invention to provide a method of conducting an on-line auction that permits individual bidders to pool their bids for a desired item. It is another object of the invention to greatly increase the number of participants in the auction by permitting individual bidders to contribute bids of any size to the total bid of their selected bidding group. It is a further object of the invention to display updated bid information in real-time for bidders to view from their remote computers.

These and other objects and advantages will become more apparent after consideration of the ensuing description and the accompanying drawings.

#### SUMMARY OF THE INVENTION

The invention presents a method of conducting an on-line auction that permits bid pooling during a bidding session of the auction. The auction is conducted over a computer network that includes a central computer, a number of remote computers, and communication lines connecting the remote computers to the central computer. In the preferred embodiment, the central computer is a world-wide web server and the communication lines are Internet lines that connect bidders at their remote computers to the world-wide web server.

The method includes the step of registering a number of bidding groups in the central computer. Bidding groups can be associations, institutions, museums, or groups formed purely for the purpose of bidding together in order to distribute items by lottery. Each bidding group has a total bid for the item being auctioned. After starting a bidding session, bids entered from the remote computers are received in the central computer. Each of the bids includes a bid amount and a bid designation. The bid designation indicates a chosen group comprising the one bidding group for which the bid is intended.

As a bid is received in the central computer, the bid amount is contributed to the total bid of the chosen group.

In the preferred embodiment, the bidding groups and the total bids are also displayed on the remote computers. Also in the preferred embodiment, the total bids are updated in real-time after each bid amount is added to one of the total bids. The next step in the method is declaring a winning group, the winning group being the one bidding group having the largest total bid at the end of the bidding session.

In a particularly advantageous embodiment, the method also includes the step of creating a bidder account for each bidder in an account creation computer networked to the central computer. Each bidder account includes a bidder name, a bidder identification number, and a financial account number, such as a bidder's credit card or savings account number. In this embodiment, each bid received in the central computer also includes the bidder name and bidder identification number of the person contributing the bid. At the close of a bidding session, each bid contributed to the total bid of the winning group is matched by bidder identification number to a corresponding bidder account. The corresponding bidder account is then charged the bid amount contributed, facilitating collection of the total bid of the winning group.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram illustrating the configuration of the computer network according to the method of the invention.

FIG. 2 is a block diagram illustrating the creation of a bidder account according to the method of the invention.

FIG. 3 is a sample account creation form appearing on the screen of the remote computer in FIG. 2.

FIG. 4 is a sample confirmation message appearing on the screen of the remote computer in FIG. 2.

FIG. 5 is a block diagram illustrating the processing of a bid according to the method of the invention.

FIG. 6 is a sample bid entry form appearing on the screen of the remote computer in FIG. 5.

FIG. 7 is a flow chart illustrating the overall flow of an auction according to the method of the invention.

FIG. 8 is a flow chart illustrating the creation of a bidder account (step 120 in FIG. 7).

FIG. 9 is a flow chart illustrating the flow of a bidding session (step 130 in FIG. 7).

FIG. 10 is a flow chart illustrating the processing of a winning group (step 140 in FIG. 7).

#### DESCRIPTION

The preferred embodiment of the invention is illustrated in FIGS. 1-10. Referring to FIG. 1, a computer network 10 includes a central computer 18 of an on-line auction company 12. Central computer 18 is connected to a database server 16 serving a bidder database 14, such that database 14 is accessible to central computer 18. Central computer 18 is further networked to a router 20 and a modem M1 for connecting central computer 18 to communication lines 24. In the preferred embodiment, central computer 18 is a world-wide web server machine and communication lines 24 are Internet lines.

Network 10 further includes an account creation computer 28 of an account company 26. Account company 26 is of the type that provides Internet users with a secure account for performing on-line commerce, such as First Virtual Holdings Incorporated located at 11975 El Camino Real, Suite 300, San Diego, Calif. Account creation computer 28 has a

modem M2 for connecting account creation computer 28 to communications lines 24.

Network 10 also includes three remote computers 30 each having a modem M3 for connecting remote computers 30 to communication lines 24. For simplicity, only three remote computers 30 are illustrated in FIG. 1. It is obvious that any number of remote computers can be connected to communication lines 24. Further, the preferred embodiment utilizes modems to connect central computer 18, account creation computer 28, and remote computers 30 to communication lines 24. It is obvious to those skilled in the art that many other methods of connection are possible, such as an ethernet connection.

Each remote computer 30 has an Internet browser 29 for displaying web content in the form of Hyper Text Markup Language (HTML). A suitable Internet browser is Netscape 2.0 available from Netscape Corporation located at 501 East Middlefield Road, Mountain View, Calif. Browser 29 allows remote computers 30 to access and display the content of an on-line auction HTML template 22 residing on central computer 18. HTML template 22 contains the main worldwide web pages displayed to on-line auction users on remote computers 30. Similarly, account creation computer 28 has an on-line account HTML template 27 accessible from remote computers 30. In a particularly advantageous embodiment, templates 22 and 27 are Secure HTML templates, and Internet browser 29 is a Secure HTML compliant browser. Using Secure HTML ensures confidentiality for the account and bid transactions that will be described below.

FIG. 2 illustrates in detail the components of central computer 18, account creation computer 28, and remote computer 30 used in the creation of a bidder account 40 and a registration record 42. A bidder 38 at remote computer 30 accesses on-line account HTML template 27 residing on account creation computer 28. Template 27 contains an account creation form 32 which is displayed to bidder 38 on the screen of remote computer 30.

FIG. 3 shows account creation form 32 in detail. Account creation form 32 has three fields 54 corresponding to a bidder name 44, a financial account number 46, and a financial account type 48. In the preferred embodiment, financial account number 46 is a credit card number corresponding to a credit card account of bidder 38. In alternative embodiments, financial account number 46 is the number of a checking account, savings account, or any other account in which bidder 38 has available cash or credit. Account creation form 32 also contains a note 56 advising bidder 38 that a bidder identification number 50 will be assigned in a new account confirmation message 34, as will be described below. Additionally, form 32 contains a button 52 for bidder 38 to press to send form 32 to account creation computer 28 after bidder 38 completes form 32.

Referring again to FIG. 2, account creation computer 28 has an electronic mail server E2 for sending new account confirmation message 34 to bidder 38 at remote computer 30. Remote computer 30 has an electronic mail client E3 for receiving and confirming new account confirmation message 34. FIG. 4 illustrates in detail the appearance of new account confirmation message 34 on the screen of remote computer 30. Message 34 includes four fields 55 corresponding to bidder name 44, financial account number 46, financial account type 48, and bidder identification number 50. Bidder identification number 50 is generated by account creation computer 28 upon receipt of a valid account creation form 32. Message 34 further contains a note 58

advising bidder 38 to confirm the new account information with account company 26.

Referring again to FIG. 2, account creation computer 28 has storage capability for storing a bidder account 40 that includes bidder name 44, financial account number 46, and bidder identification number 50. Additionally, mail server E2 is capable of generating a bidder registration message 36 upon receipt of account confirmation from remote computer 30. Registration message 36 includes bidder name 44 and bidder identification number 50. Central computer 18 has an electronic mail server E1 for receiving registration message 36 from mail server E2. Mail server E1 is linked to bidder database 14 such that a registration record 42 is created in bidder database 14 upon receipt of registration message 36. Registration record 42 includes bidder name 44 and bidder identification number 50.

FIG. 5 illustrates the main components of central computer 18, bidder database 14, and remote computer 30 used to submit and record bids in the on-line auction. On-line auction HTML template 22 residing on central computer 18 contains a bid entry form 76. Bid entry form 76 is displayed on the screen of remote computer 30 when bidder 38 accesses HTML template 22 through communication lines 24.

FIG. 6 illustrates the details of bid entry form 76. Form 76 includes a block 70 showing a graphical picture 72 and a description 74 of a current item being auctioned. Bid entry form 76 also lists three bidding groups 66 each having a total bid 68. For simplicity, only three bidding groups 66 are shown in FIG. 6. It is obvious that more than three bidding groups 66 could be included in the on-line auction. Form 76 further includes four fields 57 corresponding to bidder name 44, bidder identification number 50, bid amount 62, and bid designation 64. Located near fields 57 is an enter bid button 78 and a create account button 80. Enter bid button 78 is for bidder 38 to press to submit bid entry form 76 to central computer 18. Create account button 80 is for bidder 38 to press to connect remote computer 30 to on-line account HTML template 27 residing on account creation computer 28.

Referring again to FIG. 5, central computer 18 is linked to bidder database 14 such that central computer 18 can query registration records 42 stored in bidder database 14. This ensures that when central computer 18 receives bid entry form 76, central computer 18 can verify that bidder name 44 and bidder identification number 50 match an existing registration record 42 in database 14. Central computer 18 and bidder database 14 are further linked such that central computer 18 can store a bid record 60 in database 14. Bid record 60 includes bidder name 44, bidder identification number 50, bid amount 62, and bid designation 64.

The operation of the preferred embodiment is illustrated in FIGS. 7-10. FIG. 7 is a flow chart illustrating the overall flow of the on-line auction method beginning at step 100, the on-line auction start. To start the auction, on-line auction company 12 receives graphical picture 72 and description 74 of the current item being auctioned, as well as the names of bidding groups 66 wishing to participate in the auction. Next, in step 110, on-line auction company 12 registers bidding groups 66 in central computer 18. To register bidding groups 66, on-line auction company 12 inserts the name of each bidding group 66 into bid entry form 76 of HTML template 22.

On-line auction company 12 also inserts into bid entry form 76 graphical picture 72 and description 74 of the current item being auctioned. Next, bidders 38 connect their

remote computers 30 to central computer 18 through communication lines 24 to access bid entry form 76. When bidders 38 access bid entry form 76, graphical picture 72, description 74, bidding groups 66, and total bids 68 are displayed on their remote computers 30, as shown in FIG. 6.

Next, each bidder 38 creates their own bidder account 40 in account creation computer 28. The creation of bidder account 40 is generally indicated as step 120 in FIG. 7 and detailed in steps 120-127 in FIG. 8. To start the creation of bidder account 40, step 120 in FIG. 8, bidder 38 presses create account button 80 of bid entry form 76. Pressing create account button 80 causes Internet browser 29 to connect remote computer 30 to account creation form 32 contained in HTML template 27. Bidder 38 fills in three fields 54 of account creation form 32 with their bidder name 44, financial account number 46, and financial account type 48, as shown in FIG. 3. Bidder 38 then presses button 52 to send the new account information to computer 28, step 121.

Upon receiving the new account information, account company 26 verifies bidder name 44, financial account number 46, and financial account type 48 to ensure that they correspond to a valid financial account of bidder 38. After successful verification, account creation computer 28 generates bidder identification number 50 for bidder 38. Referring to FIG. 2, account creation computer 28 then generates new account confirmation message 34 on mail server E2 and sends message 34 to mail client E3 of remote computer 30. Bidder 38 then receives new account confirmation message 34 on mail client E3, step 122. Bidder 38 confirms his new account information by pressing button 58 of new account confirmation message 34, step 123.

Upon receiving successful confirmation of the new account information, account creation computer 28 stores bidder account 40 for bidder 38. Account creation computer 28 also generates bidder registration message 36 on mail server E2. Registration message 36 is then sent to mail server E1 of central computer 18, step 124. When central computer 18 receives message 36, central computer 18 creates registration record 42 in bidder database 14, step 125. Registration record 42 is then secured in bidder database 14 from access from remote computers 30, step 126. Securing registration record 42 ensures confidentiality of account information for bidder 38. This ends the account creation process, step 127.

Following the creation of bidder accounts 40 and registration records 42, on-line auction company 12 starts the bidding session for the auction, which is generally indicated as step 130 in FIG. 7 and detailed in steps 130-138 in FIG. 9. To submit bids, each bidder 38 completes four fields 57 of bid entry form 76 with his bidder name 44, bidder identification number 50, bid amount 62, and bid designation 64, as shown in FIG. 6. Bid amount 62 can be any size desired by bidder 38. Bid designation 64 indicates a chosen group, the chosen group being the one bidding group 66 to which bidder 38 would like bid amount 62 to be contributed. After completing bid entry form 76, bidder 38 presses enter bid button 78 to send the bid information to central computer 18.

Central computer 18 receives bid entry form 76 entered from remote computer 30, step 131. Central computer 18 then queries bidder database 14 to verify that bidder name 44 and bidder identification number 50 received on bid entry form 76 match an existing registration record 42. The query results indicate if bidder 38 has a valid bidder account 40, step 132. If the answer is NO, central computer 18 executes step 134, notifying bidder 38 that he does not have a valid

bidder account 40. After notifying bidder 38, central computer 18 proceeds to step 137, which will be described below.

If the answer is YES, central computer 18 proceeds to step 133, recording bid record 60 in bidder database 14. Bid record 60 includes bidder name 44, bidder identification number 50, bid amount 62, and bid designation 64, as shown in FIG. 5. Next, central computer 18 contributes bid amount 62 to total bid 68 of the chosen group indicated by bid designation 64, step 135. After contributing bid amount 62, central computer 18 updates total bids 68 in real-time, step 136. Changes in total bids 68 are dynamically displayed to bidders 38 by sending commands from HTML template 22 to Internet browser 29. The commands cause browser 29 to update itself so that bidders 38 may view the updated total bids 68 after each bid amount 62 is contributed. Specific techniques of updating browser 29 in this manner are well known in the art.

Next, central computer 18 determines if the bidding session is completed, step 137. If the answer is NO, central computer 18 returns to step 131, receiving another bid entry form 76. If the answer is YES, the bidding session ends, step 138. In the preferred embodiment, the bidding session runs for a pre-defined period of time, such as two weeks, so that central computer 18 can determine if the bidding session is completed by using a chronometer (not shown). A time period of two weeks is used for illustrative purposes only. It is obvious that any duration could be set for the bidding session. In an alternative embodiment, the bidding session runs until bidding activity slows below a pre-defined threshold, such as receiving fewer than three bids per day. Again, this is only an example of a pre-defined threshold. It is obvious that many other thresholds for minimum bidding activity could be set.

The next step after completing the bidding session is processing a winning group, generally indicated as step 140 in FIG. 7 and detailed as steps 140-146 in FIG. 10. At the end of the bidding session, on-line auction company 12 declares the one bidding group 66 having the largest total bid 68 the winning group, step 141. Next, the winning group is displayed on remote computers 30 for bidders 38 to view, step 142. Then, central computer 18 retrieves winning bid records from bidder database 14, step 143. The winning bid records are those bid records 60 whose bid designation 64 indicates the winning group.

Central computer 18 then sends the winning bid records from mail server E1 to mail server E2 of account company 26. Account company 26 uses bidder name 44 and bidder identification number 50 of each winning bid record to match each winning bid record to a corresponding bidder account 40, step 144. Next, for each winning bid record, account company 26 charges bid amount 62 to financial account number 46 of the corresponding bidder account, step 145. After charging bid amount 62 for each winning bid record, account company 26 transfers the funds generated to on-line auction company 12, ending the winning group processing, step 146. Upon completion of winning group processing, the on-line auction ends, step 150 in FIG. 7.

#### SUMMARY, RAMIFICATIONS, AND SCOPE

Although the above description contains many specificities, these should not be construed as limiting the scope of the invention but merely as illustrating the presently preferred embodiment. Many other embodiments of the invention are possible. For example, the auction method need not be used only for auctioning an item to a large

institution such as the New York Art Museum or Los Angeles Museum of Art. The auction method is also effective for many other applications, such as the promotion of charitable causes.

Charities often hold fund raising auctions in which they sell valuable items which have been donated to the charity. The auction method presented increases the amount of funds a charity raises in these auctions for two reasons. First, it greatly increases the number of participants by allowing easy on-line access to the auction. Second, it increases the sale price by allowing ordinary individuals, in addition to wealthy individuals, to contribute to the total bid, expanding the pool of available funds. In one possible embodiment, competitive bidding groups are formed, each bidding group representing a different charitable cause. Each bid contributed to a bidding group helps the respective charity, but only the winning group is awarded the item being auctioned. The winning group then holds a lottery to determine which one of the contributing bidders gets to keep the item.

Further, the on-line auction method described need not be conducted over the Internet using a world-wide web server machine. The method is just as effective using any computer network that allows the transmission of data between bidders at remote locations and a central processor. Similarly, modems are not necessary to network the central computer, account creation computer, and remote computers. Many other methods of connection are possible, such as ethernet connections, or dedicated communication lines.

For simplicity of understanding, the drawings and description show only three remote computers and three bidding groups. Obviously, for a high stakes auction, many more bidding groups will be registered and many more remote computers will be connected to the network. Also for simplicity of understanding, the steps of registering bidding groups and creating bidder accounts are presented before the step of starting a bidding session. This is for illustrative purposes only, as bidding groups may be registered in the central computer after the commencement of a bidding session. Bidders wishing to participate in the auction but not wishing to bid with any of the current bidding groups may form a new bidding group during the bidding session. Similarly, bidders can create bidder accounts during the bidding session if they desire to bid on the current item being auctioned.

Therefore, the scope of the invention should be determined, not by examples given, but by the appended claims and their legal equivalents.

I claim:

1. A method of conducting an auction using a computer network, said computer network comprising a central computer, a plurality of remote computers, and a plurality of communication lines connecting said remote computers to said central computer, said method comprising the following steps:

- a) registering a plurality of bidding groups in said central computer, each of said bidding groups having a total bid;
- b) receiving in said central computer bids entered from said remote computers, each of said bids comprising a bid amount and a bid designation, said bid designation indicating a chosen group comprising one of said bidding groups for which said bid is intended;
- c) contributing said bid amount to said total bid of said chosen group; and
- d) declaring a winning group, said winning group being the one bidding group having the largest total bid at the end of said bidding session.

2. The method of claim 1, wherein said communication lines comprise internet lines, said central computer comprises a world-wide web server, and said remote computers are connected to said world-wide web server through said internet lines.

3. The method of claim 1, further comprising the step of displaying on said remote computers a graphical picture and a description of a current item being auctioned.

4. The method of claim 1, further comprising the steps of displaying said bidding groups and said total bids on said remote computers and updating said total bids in real-time after each of said bid amounts is added to one of said bid totals.

5. The method of claim 1, further comprising the step of creating bidder accounts in an account creation computer networked to said central computer, each of said bidder accounts comprising a bidder name, a bidder identification number, and a financial account number.

6. The method of claim 5, wherein said bidder accounts are created by bidders from said remote computers prior to said bidders entering said bids.

7. The method of claim 5, further comprising the step of creating registration records in a bidder database accessible to said central computer, each of said registration records comprising said bidder name and said bidder identification number.

8. The method of claim 7, further comprising the step of securing said registration records in said bidder database from access by said remote computers.

9. The method of claim 7, further comprising the steps of:

- a) receiving in said central computer said bidder name and said bidder identification number with each of said bids;
- b) verifying that said bidder name and said bidder identification number match an existing registration record in said bidder database prior to adding said bid amount to said total bid; and
- c) recording a bid record in said bidder database, said bid record comprising said bidder name, said bidder identification number, said bid amount, and said bid designation.

10. The method of claim 9, further comprising the steps of:

- a) retrieving from said bidder database winning bid records comprising said bid records whose bid designation indicates said winning group;
- b) matching each of said winning bid records to a corresponding bidder account; and
- c) charging said corresponding bidder account the bid amount stored in said winning bid record.

11. A method of bid pooling during a bidding session of an auction, said auction being conducted over a computer network, said computer network comprising a central computer, a plurality of remote computers, and a plurality of communication lines connecting said remote computers to said central computer, said method comprising the following steps:

- a) registering a plurality of bidding groups in said central computer, each of said bidding groups having a total bid;
- b) receiving in said central computer bids entered from said remote computers, each of said bids comprising a bid amount and a bid designation, said bid designation indicating a chosen group comprising one of said bidding groups for which said bid is intended; and
- c) contributing said bid amount to said total bid of said chosen group.

## 11

12. The method of claim 11, wherein said communication lines comprise internet lines, said central computer comprises a world-wide web server, and said remote computers are connected to said world-wide web server through said internet lines.

13. The method of claim 11, further comprising the step of displaying on said remote computers a graphical picture and a description of a current item being auctioned.

14. The method of claim 11, further comprising the steps of displaying said bidding groups and said total bids on said remote computers and updating said total bids in real-time after each of said bid amounts is added to one of said total bids.

15. The method of claim 11, further comprising the steps of creating bidder accounts in an account creation computer networked to said central computer, each of said bidder accounts comprising a bidder name, a bidder identification number, and a financial account number.

16. The method of claim 15, wherein said bidder accounts are created by bidders from said remote computers prior to said bidders entering said bids.

17. The method of claim 15, further comprising the step of creating registration records in a bidder database accessible to said central computer, each of said registration records comprising said bidder name and said bidder identification number.

18. The method of claim 17, further comprising the step of securing said registration records in said bidder database from access by said remote computers.

## 12

19. The method of claim 17, further comprising the steps of:

- a) receiving in said central computer said bidder name and said bidder identification number with each of said bids;
- b) verifying that said bidder name and said bidder identification number match an existing registration record in said bidder database prior to adding said bid amount to said total bid; and
- c) recording a bid record in said bidder database, said bid record comprising said bidder name, said bidder identification number, said bid amount, and said bid designation.

20. The method of claim 19, further comprising the steps of:

- a) declaring a winning group comprising the bidding group having the largest total bid at the end of said bidding session;
- b) retrieving from said bidder database winning bid records comprising said bid records whose bid designation indicates said winning group;
- c) matching each of said winning bid records to a corresponding bidder account; and
- d) charging said corresponding bidder account the bid amount stored in said winning bid record.

\* \* \* \* \*



US006044363A

**United States Patent** [19][11] **Patent Number:** 6,044,363**Mori et al.**[45] **Date of Patent:** Mar. 28, 2000[54] **AUTOMATIC AUCTION METHOD****OTHER PUBLICATIONS**

[75] Inventors: **Masakatsu Mori**, Yokohama;  
**Masahiro Ogura**, Sakura; **Masahiro**  
**Takeshima**; **Kenji Arai**, both of Tokyo,  
all of Japan

[73] Assignee: **Hitachi, Ltd.**, Tokyo, Japan

[21] Appl. No.: **08/916,154**

[22] Filed: **Sep. 2, 1997**

[30] **Foreign Application Priority Data**

Sep. 4, 1996 [JP] Japan ..... 8-233918

[51] Int. Cl.<sup>7</sup> ..... **G06F 17/60**

[52] U.S. Cl. .... **705/37; 705/8; 705/26;**  
**705/27; 705/37; 705/38; 395/286**

[58] Field of Search ..... **705/37, 26, 27,**  
**705/38; 395/286**

[56] **References Cited****U.S. PATENT DOCUMENTS**

4,789,928	12/1988	Fujisaki .	
5,136,501	8/1992	Silverman et al. ....	705/38
5,689,652	11/1997	Lupien et al. ....	705/37
5,826,244	10/1998	Huberman ....	705/37
5,835,896	11/1998	Fisher et al. ....	705/37
5,890,138	3/1999	Godin et al. ....	705/26
5,905,974	5/1999	Fraser et al. ....	705/37
5,905,975	5/1999	Ausubel ....	705/37

**FOREIGN PATENT DOCUMENTS**

628 920	12/1994	European Pat. Off. .	
7-073251	3/1995	Japan .	
1489571	10/1977	United Kingdom .....	705/37
WO92/15174	3/1992	WIPO .	

"Is there a future in wholesale marketplaces", edited by Shigeo Akitani/Food distribution study society and published by Japan economic newspaper company, 1996, pp. 140-143.

Haggle Online, Proxy Bidding, <http://www.haggle.com/proxy.html>, 1996.

eBay Inc, Proxy Bidding, <http://pages.ebay.com/aw/proxy-bidding.html>, 1995.

eBay Inc, Proxy Bidding, <http://pages.ebay.com/aw/help/help-t-bid-prxy.html>, 1995.

eBay Inc, Bidding, <http://pages.ebay.com/aw/nut-bid4.html>, 1995.

*Primary Examiner*—James P. Trammell

*Assistant Examiner*—Nga B. Nguyen

*Attorney, Agent, or Firm*—Beall Law Offices

[57] **ABSTRACT**

In automatic auction method which makes it unnecessary for bidders to stay before auction terminals at the time of auction and which makes possible auction transactions on an open network on which it is difficult to assure the on-line and real time properties, a plurality of auction ordering information pieces each containing a desired price, number of purchase, and a highest possible price in competition for the desired price and received from bidder terminals via on-line circuits are collected. Until an auction issue appears, the price is lowered. If there is at least one auction issue and a desired quantity which is the sum total of the numbers of purchase of the auction issues is not satisfied, then it is determined whether there is an auction issue coinciding in price by comparing the set price with (the desired price+the highest possible price in competition). Until the desired quantity is satisfied, the price is raised.

16 Claims, 17 Drawing Sheets

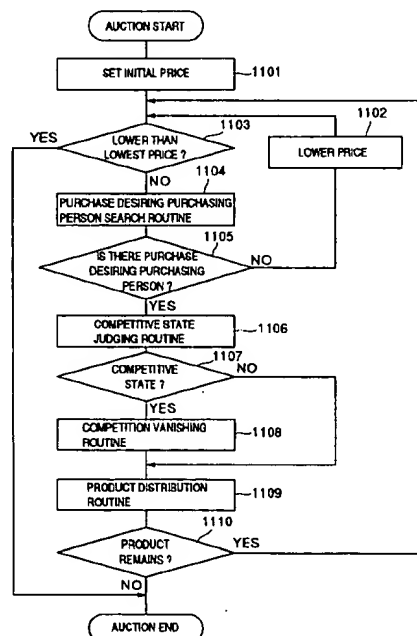


FIG. 1

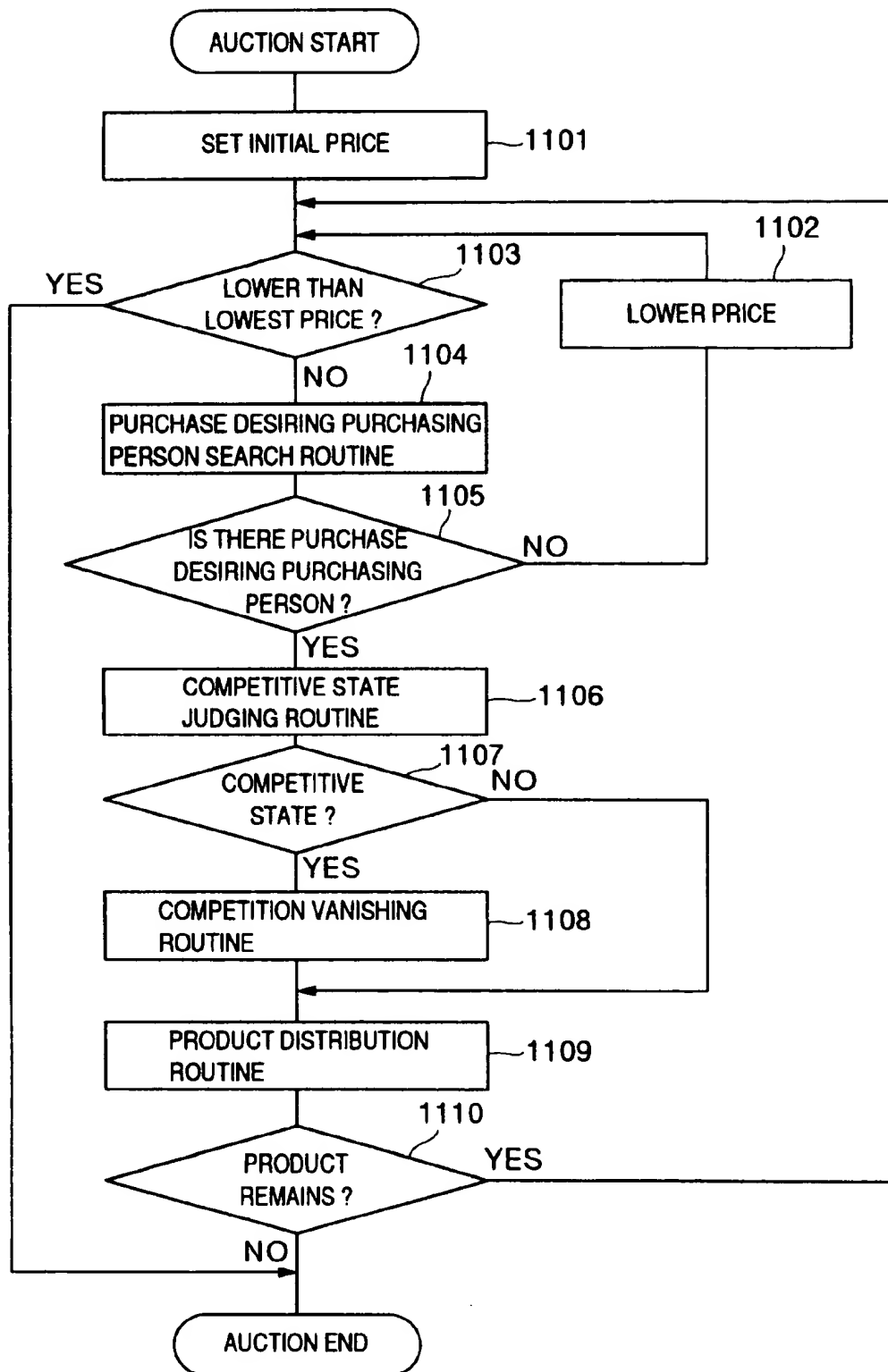




FIG. 2

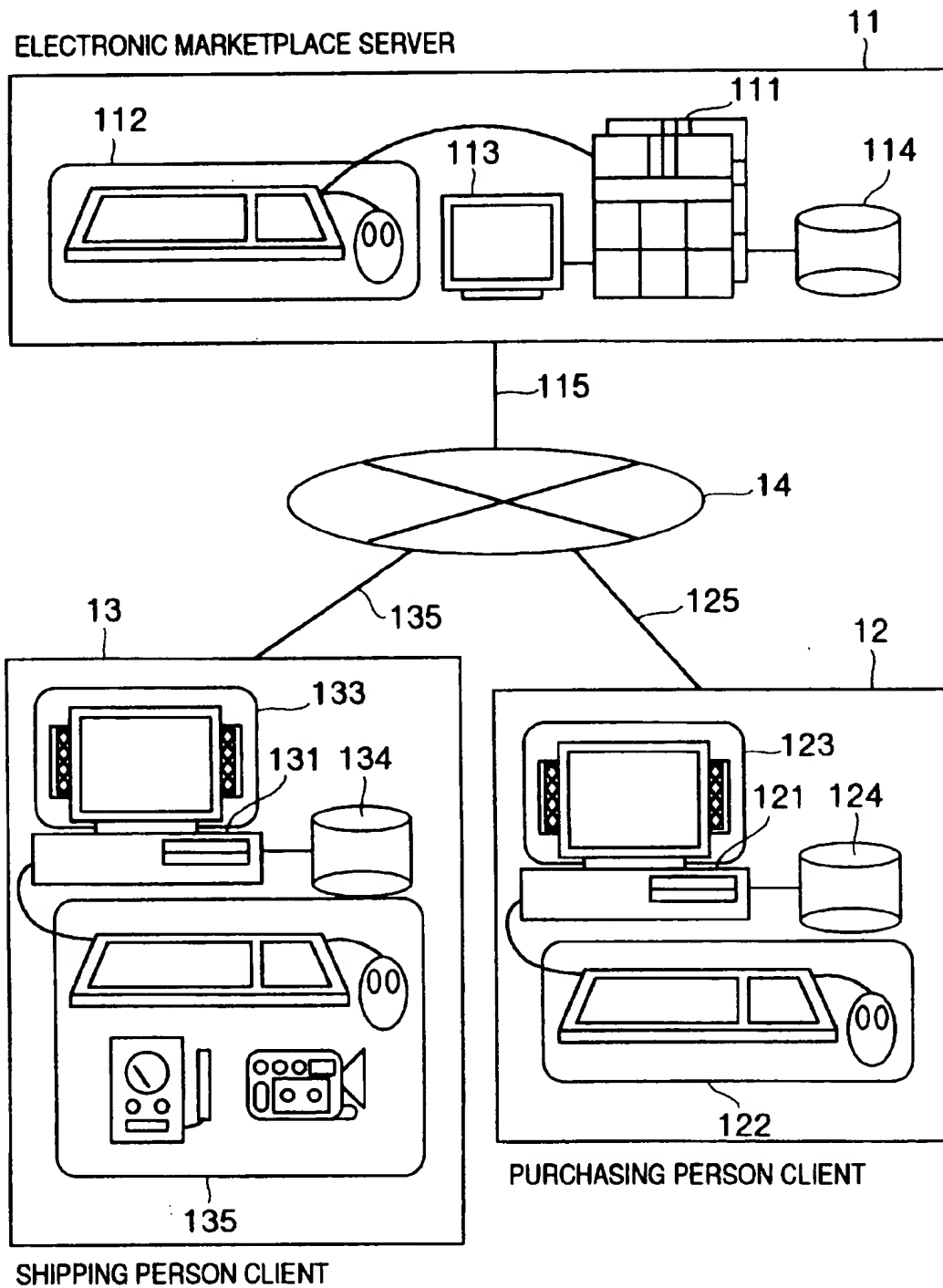


FIG. 3

OZENJI MARKETPLACE — TULIP —

◆ TULIP

PRODUCT NUMBER :215-960529-001-001

ORDER

VARIETY	OO	212
STANDARD AND COLOR	M-S	213
GROWING AREA	YOKOHAMA CITY	214
SHIPPING PERSON	UTOKUSHIGAOKA AGRICULTURAL COOPERATIVE	215
AMOUNT	200 BOXES	216
TIME LIMIT	96/05/29 15:00	217
ACTION END TIME	96/05/29 15:30	218

PRODUCT NUMBER :215-960529-001-002

ORDER

VARIETY	△△
STANDARD AND COLOR	L-S
GROWING AREA	KAWASAKI CITY
SHIPPING PERSON	NIJIGAOKA AGRICULTURAL COOPERATIVE
AMOUNT	120 BOXES

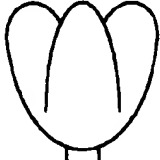
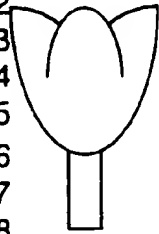


FIG. 6

AUCTION ORDERING SITUATION

◆ ORDERING PRODUCT LIST

96/05/28 12:34:56 215-960528-003-002 (FINISHED)	↑
96/05/29 13:53:21 215-960529-001-001 (FINISHED)	
96/05/29 13:53:21 215-960529-005-002 (NOT YET)	↓

DISPLAY/CORRECT ORDERING INFORMATION

SUSPEND ORDERING

DISPLAY AUCTION RESULT

CLOSE

FIG. 4

**AUCTION CONDITION INPUT EDITOR**

PURCHASING PERSON ID  311

PRODUCT NUMBER  312

RULE LIST 313

PURCHASE 80 BOXES AT ¥90 (+¥2) ↑

PURCHASE AT LEAST 50 AND AT MOST 80 BOXES AT ¥90 (+¥4) ↓

☒ DO NOT PARTICIPATE IN AUCTION ONCE SUCCESSFUL BID HAS BEEN CONDUCTED 314

NEWLY REGISTER 321 PRIORITY ↑ 324

CORRECT 322 DELETE 323 PRIORITY ↓ 325

TRANSMIT 326 SUSPEND 327

FIG. 5

**RULE EDITOR**

◆ PRICE CONDITION 411

☒ SPECIFIED PRICE 412  YEN

☐ LOWEST PRICE

MAXIMUM ALLOWANCE IN COMPETITION  YEN 413

◆ AMOUNT CONDITION (ARRIVAL AMOUNT: 200)

☐ ALL AMOUNT PURCHASE 421

☐ FIXED AMOUNT PURCHASE 422  BOXES

☒ RANGE DESIGNATION PURCHASE:  TO  BOXES 423 424

☐ PURCHASE EVEN IF DESIRED AMOUNT IS NOT REACHED 425

REGISTER IN RULE LIST 431 SUSPEND 432

FIG. 7

AUCTION RESULT OF PRODUCT(215-960529-001-001)

◆ SUCCESSFUL BID RESULT — 611

SUCCESS BID OF 80 BOXES AT ¥93

---

60 BOXES AT ¥95 FOR FIRST PERSON  
80 BOXES AT ¥93 FOR SECOND PERSON  
60 BOXES AT ¥88 FOR THIRD PERSON

◆ TRANSACTION PROCESS 612

(¥91:200 BOXES) THERE ARE NO DESIRING PERSONS  
(¥90:200 BOXES) COMPETITION OCCURRENCE AND PRICE RISE  
(¥91:200 BOXES) COMPETITION CONTINUATION AND PRICE RISE  
(¥92:200 BOXES) COMPETITION CONTINUATION AND PRICE RISE  
(¥93:200 BOXES) COMPETITION VANISHED AND SUCCESSFUL  
BIDDER DETERMINED  
SECOND PERSON CONDUCTED SUCCESSFUL  
BID FOR 80 BOXES AT ¥93

◆ RULE RESULTS — 613

(1) PURCHASE AT LEAST 50 AND AT MOST 80 BOXES AT ¥90 (+¥4):  
SUCCESSFUL BID OF 80 BOXES HAS BEEN CONDUCTED AT ¥93

(2) PURCHASE AT LEAST 80 AND AT MOST 120 BOXES AT ¥88 (+¥4):  
NOT USED

CLOSE 614

FIG. 8

71

ELECTRONIC MARKETPLACE MONITOR

◆ REGISTERED PURCHASING PERSON LIST	712	NUMBER OF REGISTRATIONS	713	PRODUCT NUMBER	711
REGISTRATION NUMBER 7121	1	REGISTRATION NUMBER 7122	2	REGISTRATION NUMBER 3	215-960529-001-001
PURCHASING PERSON ID teramura	7122	PURCHASING PERSON ID yokomura	7123	PURCHASING PERSON ID kosaka	
TRANSMISSION TIME 96/05/29 12:34:56	7123	TRANSMISSION TIME 96/05/29 12:44:56	7124	TRANSMISSION TIME 96/05/29 13:05:23	
RECEPTION TIME 96/05/29 12:35:00		RECEPTION TIME 96/05/29 12:45:00		RECEPTION TIME 96/05/29 13:06:28	

714

715

716

PRODUCT CHANGE

END

FIG. 9

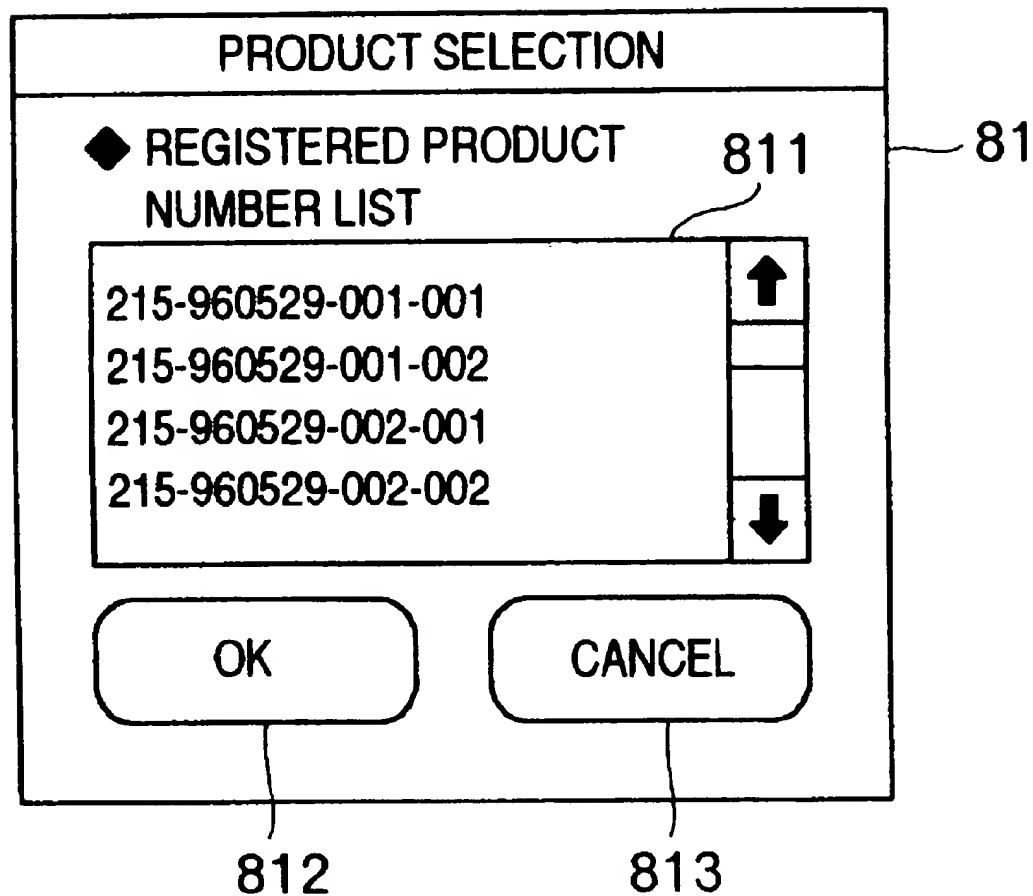


FIG. 10

71

ELECTRONIC MARKETPLACE MONITOR

REGISTERED PURCHASING PERSON LIST	NUMBER OF REGISTRATIONS	PRODUCT NUMBER	719
<div style="display: flex; justify-content: space-between;"> <div>           1            teramura            96/05/29 12:34:56            96/05/29 12:35:00         </div> <div>           2            yokomura            96/05/29 12:44:56            96/05/29 12:45:00         </div> <div>           3            kosaka            96/05/29 13:05:23            96/05/29 13:06:28         </div> <div>           4            m-mori            96/05/29 13:53:16            96/05/29 13:53:21         </div> </div>	4	215-960529-001-001	

714

NEW PURCHASING PERSON HAS BEEN REGISTERED

FIG. 11

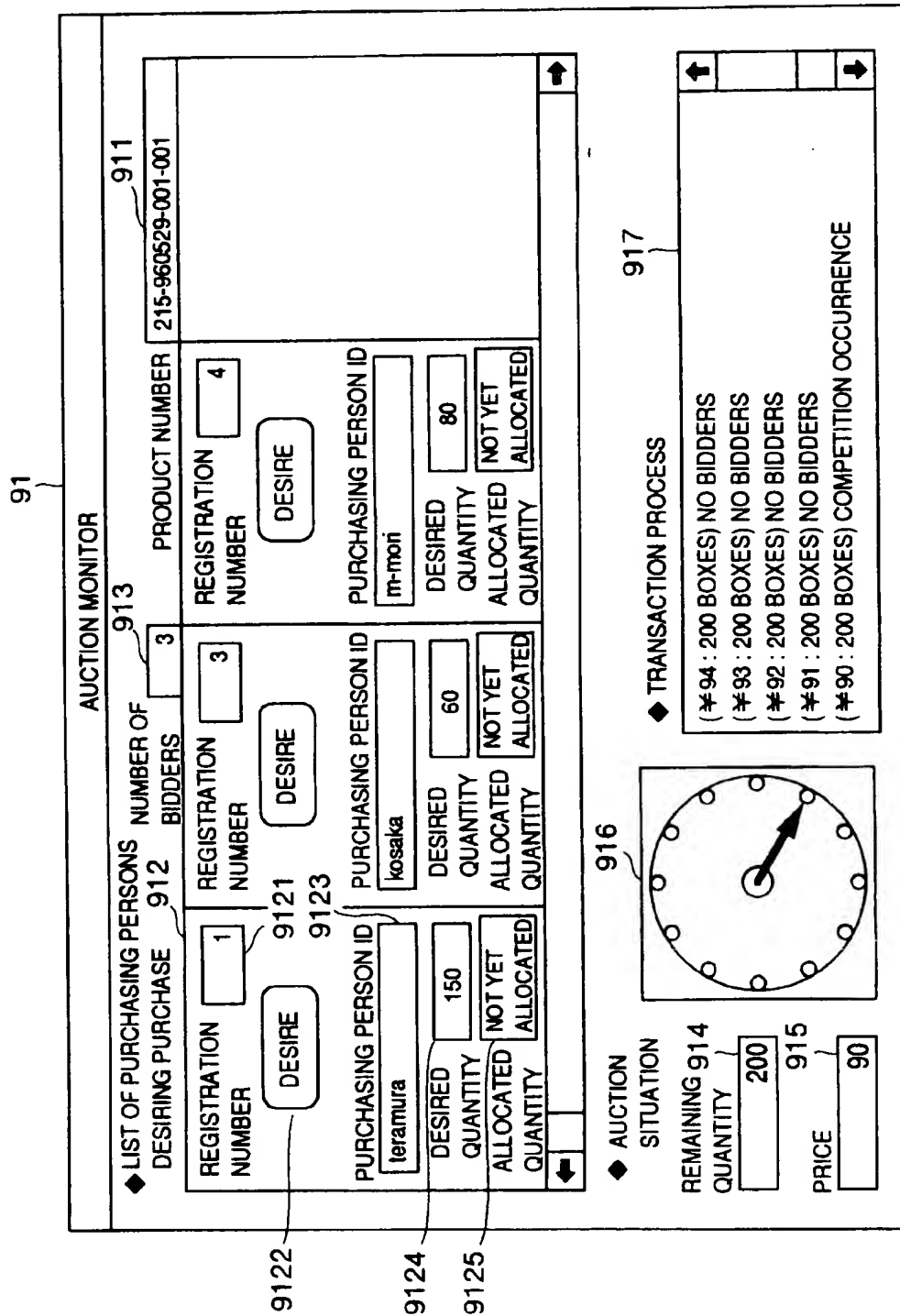




FIG. 12

91

**AUCTION MONITOR**

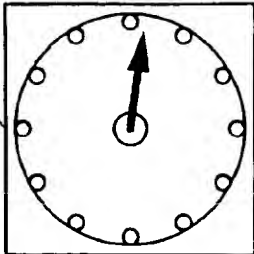
◆ LIST OF PURCHASING PERSONS DESIRING PURCHASE		NUMBER OF BIDDERS	3	PRODUCT NUMBER	215-960529-001-001
REGISTRATION NUMBER 1 ABANDON	REGISTRATION NUMBER 3 DESIRE	REGISTRATION NUMBER 4 ABANDON			
PURCHASING PERSON ID teramura	PURCHASING PERSON ID kosaka	PURCHASING PERSON ID m-mori			
DESIRED QUANTITY 150 NOT YET ALLOCATED QUANTITY	DESIRED QUANTITY 60 NOT YET ALLOCATED QUANTITY	DESIRED QUANTITY 80 NOT YET ALLOCATED QUANTITY			

◆ AUCTION  
SITUATION

REMAINING  
QUANTITY 200

PRICE 93

916



◆ TRANSACTION PROCESS

917

(¥91 : 200 BOXES) NO BIDDERS

(¥90 : 200 BOXES) COMPETITION OCCURRENCE, PRICE RISE

(¥91 : 200 BOXES) COMPETITION CONTINUATION, PRICE RISE

(¥92 : 200 BOXES) COMPETITION CONTINUATION, PRICE RISE

(¥93 : 200 BOXES) COMPETITION VANISHMENT

FIG.13

91

AUCTION MONITOR			
◆ LIST OF PURCHASING PERSONS DESIRING PURCHASE	NUMBER OF BIDDERS	3	PRODUCT NUMBER
REGISTRATION NUMBER <input type="text" value="1"/> ABANDON	REGISTRATION NUMBER <input type="text" value="3"/> SUCCESSFUL BID	REGISTRATION NUMBER <input type="text" value="4"/> ABANDON	<input type="text" value="215-960529-001-001"/>
PURCHASING PERSON ID <input type="text" value="teramura"/> DESIRED QUANTITY <input type="text" value="150"/> ALLOCATED QUANTITY <input type="text" value="NOTHING"/>	PURCHASING PERSON ID <input type="text" value="kosaka"/> DESIRED QUANTITY <input type="text" value="60"/> ALLOCATED QUANTITY <input type="text" value="60"/>	PURCHASING PERSON ID <input type="text" value="m-mori"/> DESIRED QUANTITY <input type="text" value="80"/> ALLOCATED QUANTITY <input type="text" value="NOTHING"/>	

◆ AUCTION SITUATION REMAINING 914 QUANTITY <input type="text" value="140"/> PRICE <input type="text" value="93"/>	◆ TRANSACTION PROCESS (¥90:200 BOXES) COMPETITION OCCURRENCE, PRICE RISE (¥91:200 BOXES) COMPETITION CONTINUATION, PRICE RISE (¥92:200 BOXES) COMPETITION CONTINUATION, PRICE RISE (¥93:200 BOXES) COMPETITION VANISHMENT, SUCCESSFUL BIDDER DETERMINED KOSAKA MADE SUCCESSFUL BID FOR 60 BOXES AT ¥93
---	---

FIG. 14

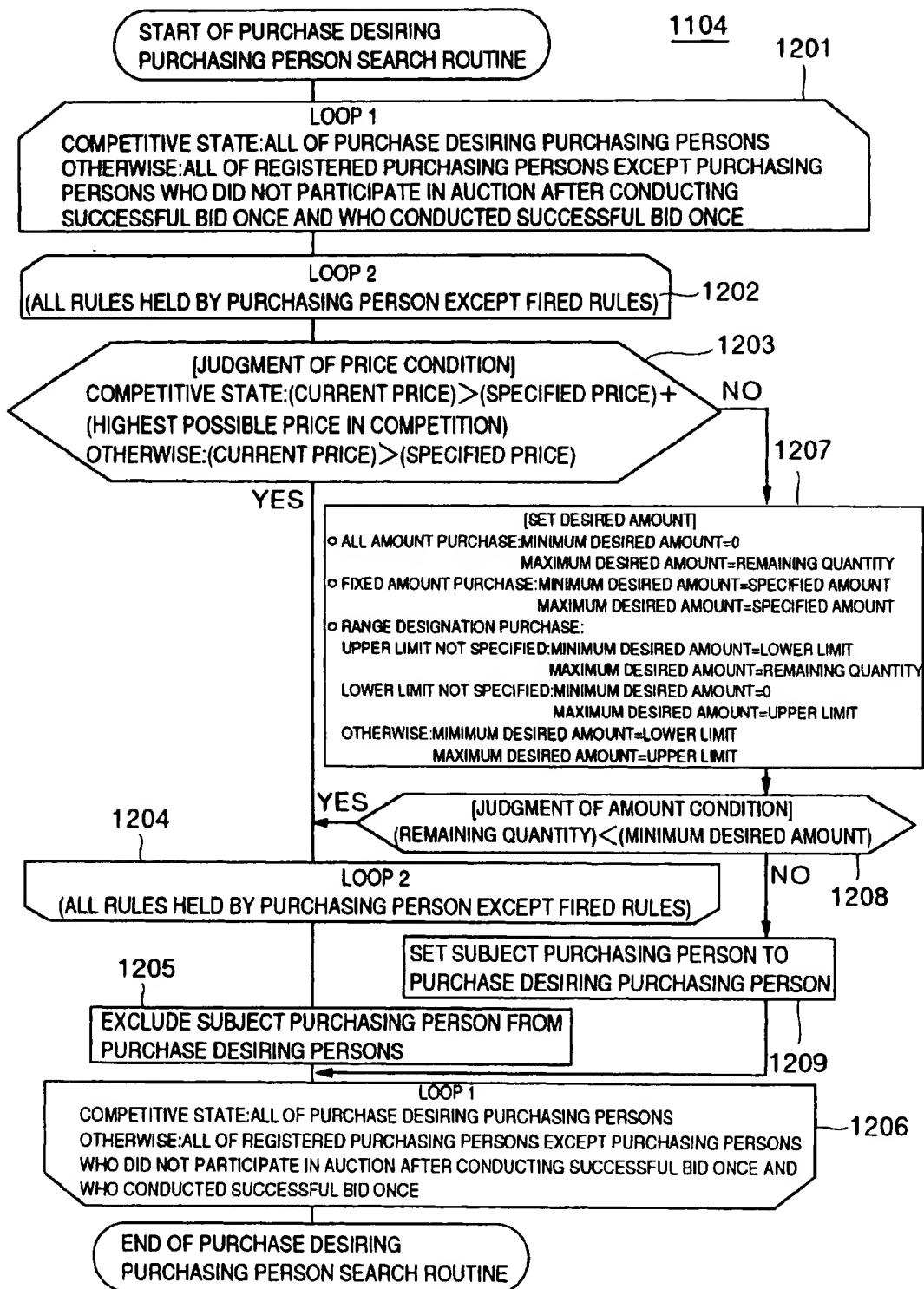


FIG. 15

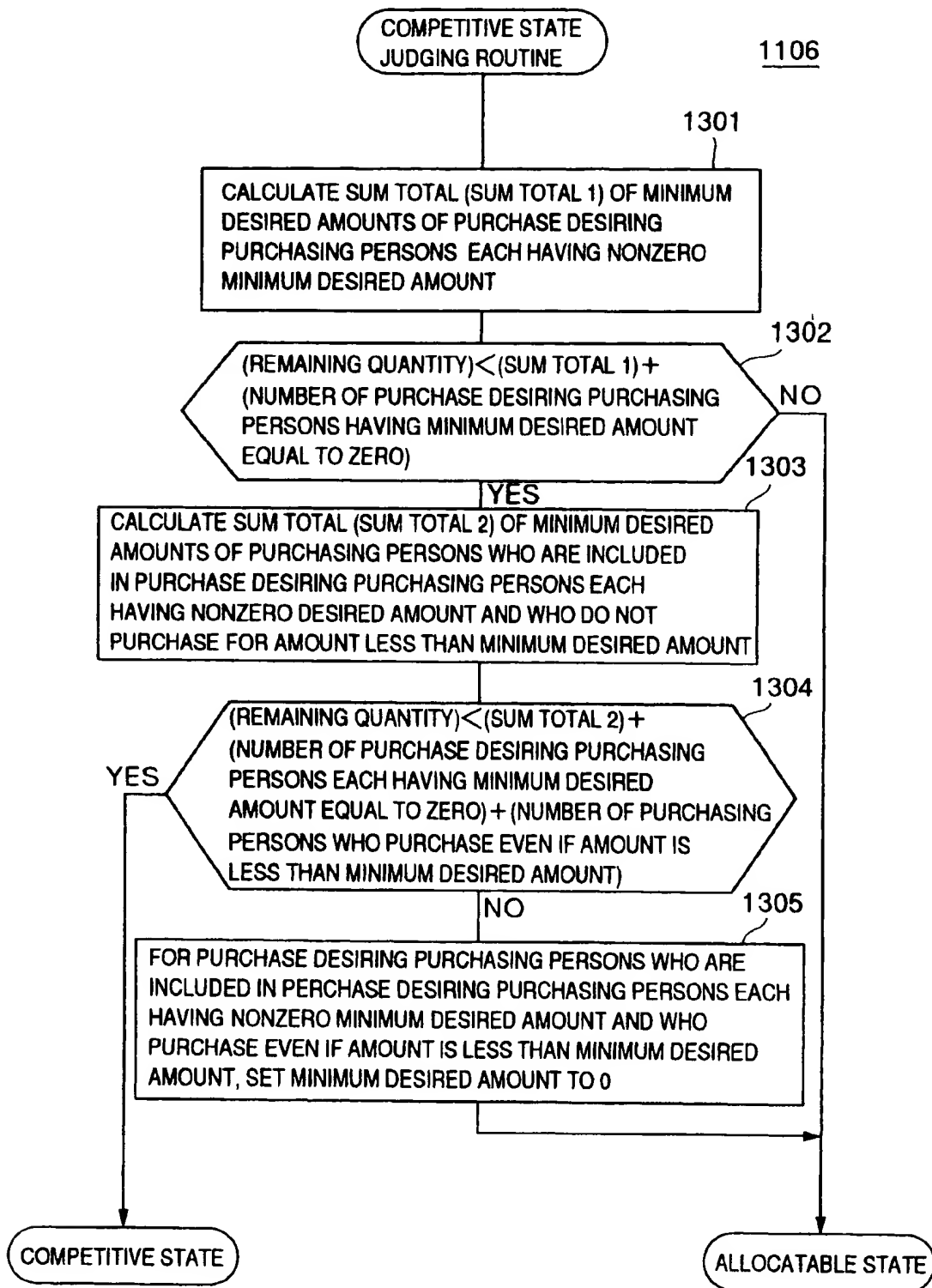


FIG.16

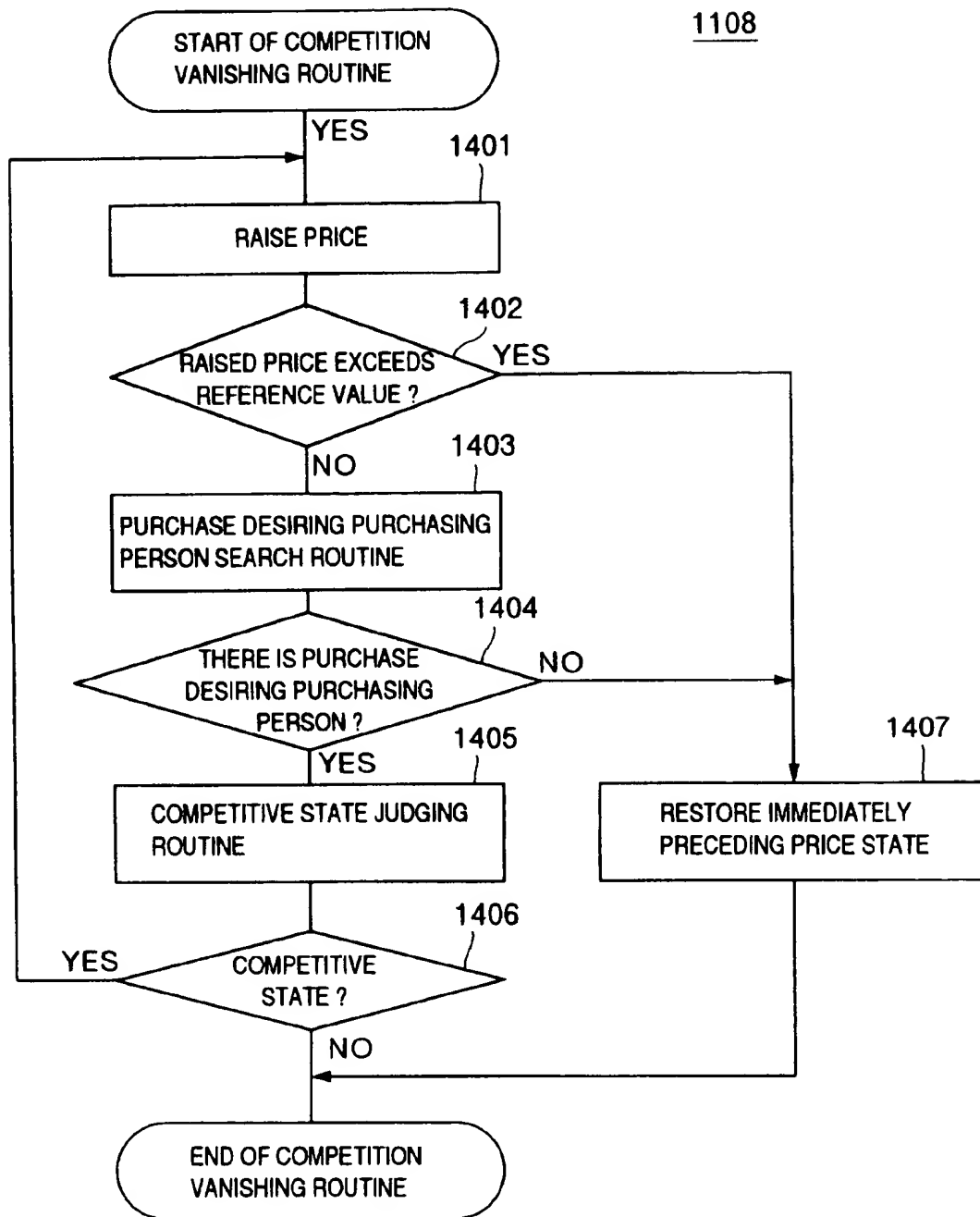


FIG. 17

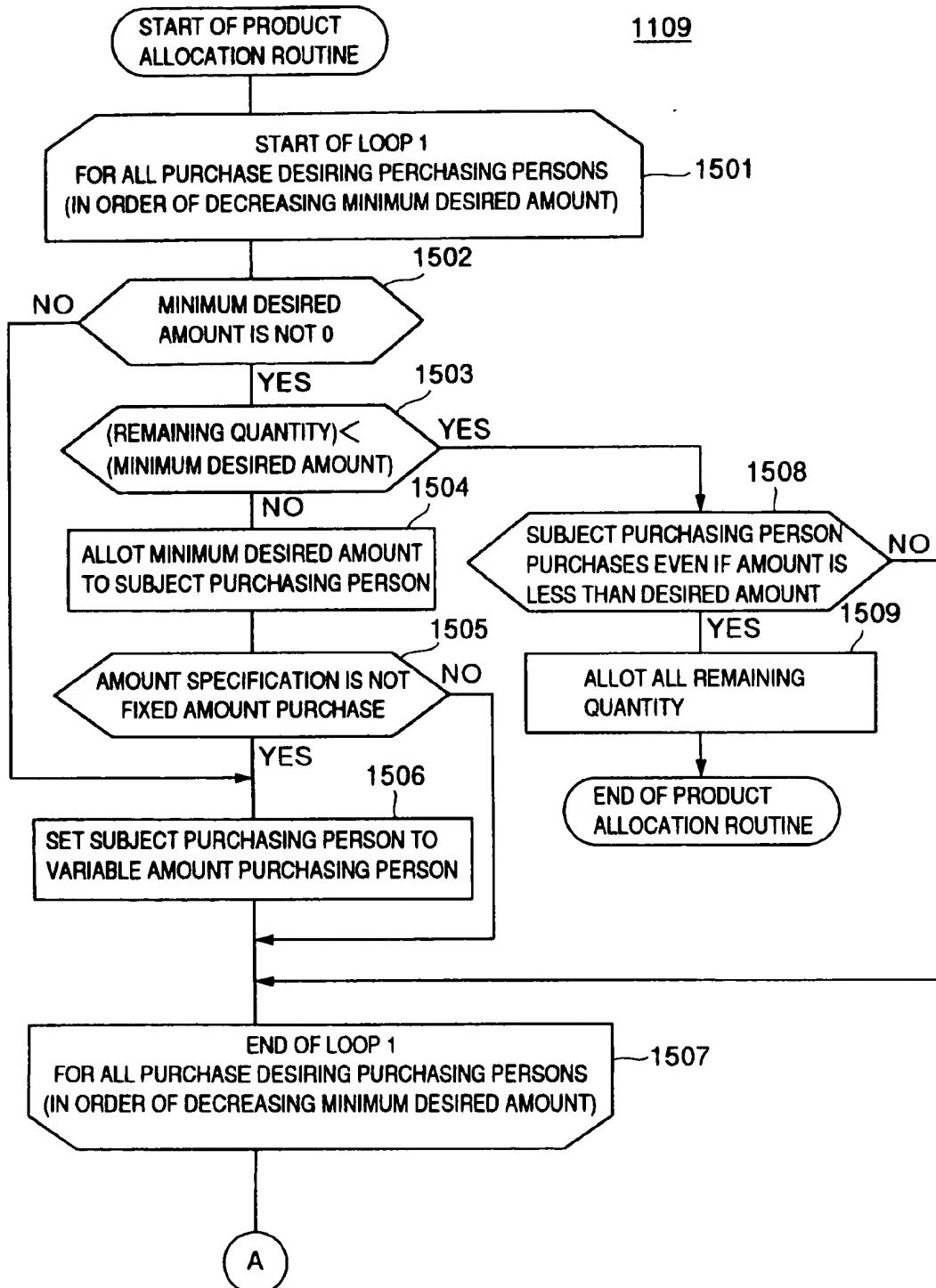


FIG. 18

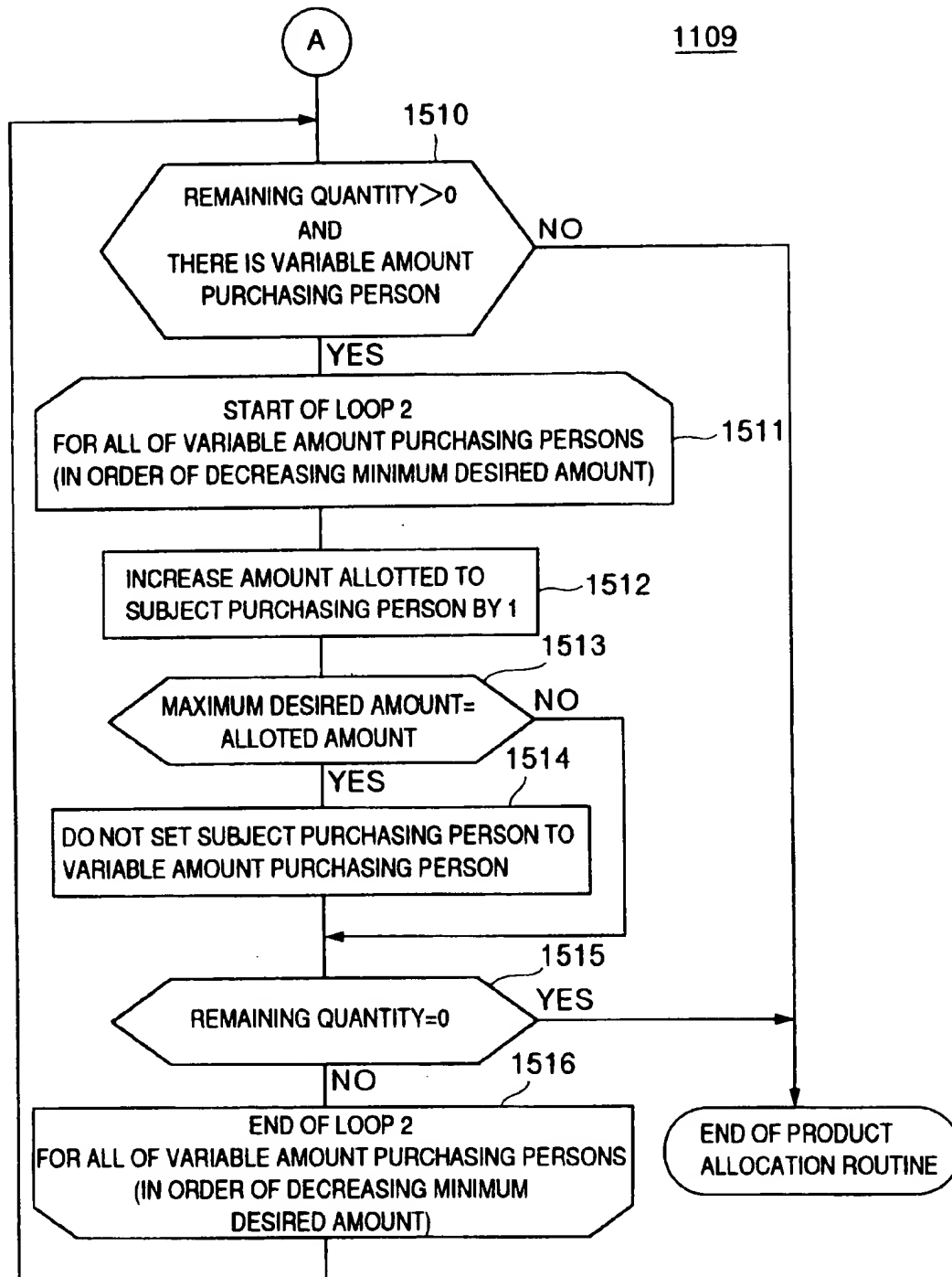


FIG.19

2010

[AUCTION CONDITION]	
QUANTITY	200 BOXES
INITIAL PRICE	¥100
INCREMENT OF DESCENDING PRICE	¥1
LOWEST PRICE	¥70
INCREMENT OF ASCENDING PRICE	¥1
IN COMPETITION	
HIGHEST ASCENDING PRICE	¥10

FIG.20

2020

[REGISTERED PURCHASING PERSONS AND AUCTION ORDERING INFORMATION]	
[PURCHASING PERSON A]	
PURCHASE 60 BOXES AT ¥95 (+¥2)	---2021
PURCHASE ALL AMOUNT AT LOWEST PRICE (+¥2)	
[PURCHASING PERSON B]	
PURCHASE 100 BOXES AT ¥90 (+¥2)	---2022
PURCHASE 70 TO 100 BOXES AT ¥90 (+¥4)	
DO NOT PARTICIPATE IN AUCTION AFTER CONDUCTING SUCCESSFUL BID ONCE	
[PURCHASING PERSON C]	
PURCHASE 80 BOXES AT ¥90 (+¥4)	---2023
[PURCHASING PERSON D]	
PURCHASE 50 TO 150 BOXES AT ¥88 (+¥3)	---2024



## AUTOMATIC AUCTION METHOD

## BACKGROUND OF THE INVENTION

The present invention relates to an auction method using a communication network. In particular, the present invention relates to an automatic auction method whereby purchasing persons located in remote places participate in a transaction by sending auction ordering information to an auctioneer via an open communication network represented by the Internet and an auction is automatically conducted on the basis of the auction ordering information.

Wholesale marketplaces serve as places for making distribution of fresh foods and the like smooth and making transactions of them proper. In particular, prices formed in wholesale marketplaces exert great influences on the growing areas and consumption. In the wholesale marketplace system, therefore, prices need to be formed by quick and fair valuation based upon the supply-demand relations of the fresh foods. Accordingly, purchase and sale transactions in wholesale marketplaces are conducted by the "auction or sealed bid" in principle.

As against such a principle, transaction forms such as the "receipt in advance" (the wholesale before the sale start time) have become the mainstream instead of the marketplace transactions as a result of the increase in scale of growing areas, the increase in distance from growing areas, the increase in scale of retail departments, and the progress of intensiveness of the retail departments. In addition, electronic products are also becoming subjects of transactions.

In order to destroy such a status quo, "information transactions" using advance shipping information given from shipping persons by making information concerning transactions electronic are now under study in various places. As one form realizing this information transaction, a system is shown in JP-B-7-117976. In this system, shipping information given from shipping persons is provided to wholesalers and bidders, the wholesalers and the bidders conduct a bid on the basis of the shipping information, and a wholesaler or a bidder of the highest price makes a successful bid. As a method for mechanically conducting transaction processing which relates to the information transactions, there is a mechanical auction ("Is there a future in wholesale marketplaces," edited by Shigeo Akitani/Food distribution study society and published by Japan economic newspaper company in 1996, pp. 140-143). In the mechanical auction, all purchasing persons gather around a marketplace, and present desired prices from respective terminal devices. Besides this, the mechanical auction described in this paper provides the following function. Even if a certain person is not present in the marketplace, the person can effect a sealed bid at the time of the auction so long as the person inputted beforehand desired quantities and desired prices for a desired list of articles.

In the former cited JP-B-7-117976, mechanization of a sealed bid is described. In the mechanical auction of the latter cited paper, auction mechanization is described. In an actual auction, however, a purchasing person does not always conduct a successful bid at a preset desired price. Even in the case where the latter cited auction mechanization is employed, price presentation needs to be conducted between the bidder and the auctioneer according to the situation of the auction several times until the end of the auction. While the auction is being conducted, a person restrained before an auction terminal device needs to form a judgment and give instructions according to the situation of the auction.

Furthermore, in the case of an auction, bidders must cope with the present situations extemporaneously. Therefore, the bidders must participate on-line and in real time.

## SUMMARY OF THE INVENTION

An object of the present invention is to provide an automatic auction method which makes it unnecessary for the bidders to be constrained before terminal devices at the time of execution of an auction even if the situation of the auction changes every moment.

Another object of the present invention is to provide an automatic auction method which makes possible auction transactions on open networks such as the Internet.

Another object of the present invention is to provide an automatic auction method whereby auction prices can be automatically determined.

In order to achieve the above described objects, an auction is executed by the following procedure in a system in which bidder terminals are connected to an auctioneer terminal via on-line circuits.

On bidder terminals, information about an auction received from the auctioneer terminal via on-line circuits is displayed. This information about the auction may be procured spontaneously by the bidders via the Internet or personal computer communication, or may be forcibly sent to bidders by the auctioneer via electronic mail.

On bidder terminals, information about the auction is displayed. An auction subject is selected by each bidder (terminal operator). For the selected auction subject, the number of purchase, a desired price, and the highest possible price in competition for the desired price (a variation value indicating an addition allowed for the desired price) are specified on the screen by the bidder. Auction ordering information containing these information pieces is created, and transmitted to the auctioneer terminal.

The display and information inputting on the bidder terminal can be implemented by using, for example, a browser broadly known in the Internet. A plurality of inputted information pieces may also be sent to a server by using the function of the known browser.

For each selected auction subject, a flag specifying whether participation in the auction should be conducted after effecting a successful bid once, or a flag specifying whether a purchase should be conducted even if the number of purchase is less than a desired amount, can be added to the auction ordering information. The number of purchase can be specified by any method selected out of constant quantity designation, quantity range designation, and remaining quantity designation.

The auctioneer terminal collects and stores a plurality of auction ordering information pieces received via on-line circuits such as the Internet. These auction ordering information pieces have been sent from a plurality of bidders. At the auction start time, for example, such as 10 a.m. everyday, an auction is started. At the auction, a price is first set. As for this price, an initial value for starting the auction may be inputted. Subsequently, the stored auction ordering information pieces are searched for a desired price coinciding with the set price. If there are auction issues, those transactions are settled. Otherwise, a price is reset.

As for the price resetting, the price is lowered in the case where there are no auction issues (i.e., in the case of a noncompetitive state). In the case where the amount of the auction subject does not satisfy auction issues (in the case where (the amount which can be auctioned) < (auction

issues), i.e., in the case of the competitive state), the auction price is raised. It is determined by effecting a comparison with the desired price whether there is a coinciding auction issue. In the case of the competitive state, however, it is determined by comparing (the set auction price) with ((the desired price)±(the highest possible price in competition)) whether there is an auction issue satisfying the condition.

Until all auction issues are sold or a fixed price is reached, such processing is repeated.

The processing to be executed on the bidder terminals and the auctioneer terminal can be implemented by using computer programs. These programs can be stored on a storage medium such as a floppy disk, an optical disk, or a hard disk, and can be distributed via a network.

#### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an entire processing flow diagram of an automatic auction method in an embodiment of the present invention;

FIG. 2 is a system configuration diagram showing an embodiment of the present invention;

FIG. 3 is a product information providing screen in an embodiment of the present invention;

FIG. 4 is an auction condition input editor in an embodiment of the present invention;

FIG. 5 is an auction rule editor in an embodiment of the present invention;

FIG. 6 is an auction ordering situation screen in an embodiment of the present invention;

FIG. 7 is an auction result screen in an embodiment of the present invention;

FIG. 8 is an electronic marketplace monitor in an embodiment of the present invention;

FIG. 9 is a selection screen of products monitored by the electronic marketplace monitor in an embodiment of the present invention;

FIG. 10 shows the electronic marketplace monitor in the case where there is a new registrator in an embodiment of the present invention;

FIG. 11 shows an auction monitor in competition in an embodiment of the present invention;

FIG. 12 shows the auction monitor at the time competition vanishes in an embodiment of the present invention;

FIG. 13 shows the auction monitor at the time of a successful bid in an embodiment of the present invention;

FIG. 14 is a processing flow diagram of a purchase desiring purchasing person search routine showing an embodiment of the present invention;

FIG. 15 is a processing flow diagram of a competition judging routine showing an embodiment of the present invention;

FIG. 16 is a processing flow diagram of a competition vanishing routine showing an embodiment of the present invention;

FIG. 17 is a processing flow diagram of a product allocation routine showing an embodiment of the present invention;

FIG. 18 is a processing flow diagram of a product allocation routine showing an embodiment of the present invention and is a continuation of FIG. 17;

FIG. 19 shows auction conditions showing an embodiment of the present invention; and

FIG. 20 shows registered purchasing persons and auction ordering information showing an embodiment of the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereafter, embodiments of the present invention will be described in detail by referring to the drawing.

FIGS. 1 and 14 through 18 show processing flows of the present embodiment. FIG. 2 is an entire configuration diagram of a system of the present embodiment. FIGS. 3 through 13 show screen images of the present embodiment.

First of all, the entire configuration diagram of an automatic auction system shown in FIG. 2 will now be described.

In the automatic auction system of the present embodiment, an electronic marketplace server 11, a plurality of purchasing person clients 12, and a plurality of shipping person clients 13 are linked via a communication network 14. The electronic marketplace server 11 conducts collection and management of product information sent from the shipping person clients 13 and auction ordering information sent from the purchasing person clients 12, and conducts an auction on the basis of the auction ordering information. The purchasing person clients 12 issue product orders to the electronic marketplace server 11. The shipping person clients 13 provide the electronic marketplace server 11 with product information of shipped products. As the network 14, a personal computer network using a LAN, the Internet, or a public telephone network, or an arbitrary different wired or wireless network, can be used.

##### (1) Device Configuration of Electronic Marketplace Server 11

The electronic marketplace server 11 is a device for auction. As for the configuration, an input device 112, an output device 113, a storage device 114, and a communication cable 115 are connected to a computer 111.

The input device 112 is a device, such as a keyboard or a pointing device (mouse, pen or the like), used by an operator to input information.

The output device 113 is a device for visibly displaying registered product information on a screen or a paper medium. As the output device 113, a CRT display, a liquid crystal display, a printer device or the like, for example, can be used.

The storage device 114 is a device for storing a program executed by the computer 111 and a large quantity of data files. As the storage device 114, a magnetic disk, an optical disk, an optical magnetic disk, a semiconductor memory, or the like can be used.

In the storage device 114 of the electronic marketplace server 11, information concerning shipping products, such as varieties, ranks, amounts, prices, and producers, provided by the shipping person client 13 is stored beforehand.

The communication cable 115 is, for example, a telephone circuit for transmitting the information. As the communication cable 115, a cable capable of transmitting a large quantity of data at high speed, such as an optical cable, is desirable. If in this case data are sent/received between the electronic marketplace server 11 and the communication network 14 by using a wireless communication circuit, a wireless communication circuit interface is provided instead of the communication cable 115.

In order to provide the product information stored in the storage device simultaneously to a large number of other systems and accept the auction ordering information, it is desirable to use a computer of high speed and large capacity, a work station, or a personal computer as the electronic marketplace server 11.

##### (2) Device Configuration of Purchasing Person Client 12

In the purchasing person client 12, an input device 122, an output device 123, a storage device 124, and a communi-

cation cable 125 are connected to a computer 121. The Structures of these elements are fundamentally the same as those of the input device 112, the output device 113, the storage device 114, and the communication cable 115, and consequently their descriptions will be omitted.

(3) Device Configuration of Shipping Person Client 13

In the shipping person client 13, an input device 132, an output device 133, a storage device 134, and a communication cable 135 are connected to a computer 131. The Structures of these elements are fundamentally the same as those of the input device 112, the output device 113, the storage device 114, and the communication cable 115, and consequently their descriptions will be omitted.

(4) Device Configuration of Communication Network 14

The device configuration of the communication network 14 can be formed by a high-speed communication network, for example, such as a B-ISDN or an ATM-LAN. To be concrete, the communication network 14 is an open network represented by the Internet, or a network using a private circuit of personal computer communication or the like.

The purchasing person client 12 is a bidder terminal. The electronic marketplace server 11 is an auctioneer terminal.

The summary of the processing flow of the present embodiment will be hereafter described.

First of all, the shipping person client 13 registers information of products to be shipped into the electronic market server 11.

The electronic marketplace server 11 notifies the purchasing person client 12 of the registered product information by using, for example, the WWW (World Wide Web) or the like. At a predetermined time, the electronic marketplace server 11 accepts auction ordering information from the purchasing person client 12.

By using a method which will be described later, the purchasing person client 12 procures product information from the electronic marketplace server 11. In the case where products desired to be bought have been found, the purchasing person client 12 creates auction ordering information by using a method which will be described later, and registers it in the electronic marketplace server 11. If the predetermined time limit for auction ordering information has not been reached, the purchasing person client 12 can amend or delete the registered auction ordering information by using a method which will be described later.

The electronic marketplace server 11 manages and monitors the auction ordering information. When the time limit for auction ordering information has been reached, the electronic marketplace server 11 terminates the acceptance of auction ordering information, and conducts an auction on the basis of the accepted auction ordering information by using a method which will be described later. Then the electronic marketplace server 11 notifies the purchasing person client 12 of an auction result by using, for example, the WWW (World Wide Web), electronic mail, or the like.

By using a method which will be described later, the purchasing person client 12 procures the result of the auction from the electronic marketplace server 11.

Hereafter, respective methods will be further described by referring to the drawing.

By using a browser of the WWW installed in the computer 121, the purchasing person client 12 accesses the electronic marketplace server 11, and procures the product information. A screen displayed to the browser is a product information screen 21 shown in FIG. 3. On the screen, a product number 211 and attribute information of the product are displayed as the product information. The product attribute information includes variety 212, standard and

color 213, a growing area 214, a shipping person 215, an amount 216, and a product image 219 such as a color photograph of the product. As information concerning the auction, the time limit for auction ordering information 217 and scheduled auction end time 218 may also be included in the product information. In the case where a purchasing person serving as a bidder wants to purchase a displayed product, the purchasing person presses an ordering button 221 associated with the product with the mouse.

If the ordering button 221 on the product information screen 21 shown in FIG. 3 is pressed, an auction condition input editor 31 shown in FIG. 4 appears. In the auction condition input editor 31, a purchasing person ID 311 representing a bidder and an ordering product number 312 are displayed. As the purchasing person ID, the electronic mail address and other specific identifiers, for example, of the purchasing person can be used. As for the product number 312, the product number 211 of the product selected on the screen of FIG. 3 is automatically stored. A rule list 313 forms a part of the auction ordering information sent to the electronic marketplace server 11. The rule list 313 includes a desired auction price which is a purchase condition of the product, a purchase amount, and a maximum allowed price in competition for the desired price. For example, the representation "purchase 80 boxes at ¥90 (+¥2)" in FIG. 4 indicates that the desired auction price is ¥90, the maximum allowed price in competition is +¥2, and the purchase amount is 80 boxes. In other words, the purchasing person desires to buy the product at ¥90, but up to ¥92 can be paid in the case of competition with another purchasing person. A field 314 is information specifying whether the purchasing person will participate in the auction after the purchasing person has conducted a successful bid once.

A new rule registration button 321, a rule correction button 322, a rule deletion button 323, a rule priority raising button 324, a rule priority lowering button 325, a button 326 for transmitting the auction ordering information to the electronic marketplace server 11, and a button 327 for suspending the auction ordering information creation are icons displayed on the screen.

If the purchasing person presses the new registration button 321, or selects one of the rules displayed in the rule list 313 and thereafter presses the correction button 322, a rule editor shown in FIG. 5 is displayed and rule generation/correction is conducted. The rule editor 41 may be displayed by switching from the auction condition input editor 31, or on the same screen by using the multi-window technique.

In the rule editor 41, a field 411 is used to select a price input method. Either the case where a price is specified or the case where the purchase at the lowest price is desired is specified. A field 412 located in the vicinity thereof is a field for inputting a price in the case where a price is specified. A field 413 is used to input a maximum allowance in competition. A field 421 is used to select an amount input method serving as a condition of the purchase amount. Three specification methods are prepared: all amount purchase, fixed amount purchase, and range designation purchase. The all amount purchase specifies the purchase of the all purchasable amount in the auction. The fixed amount purchase specifies the purchase of a predetermined fixed amount. The range designation purchase specifies the purchase amount by using a range. Furthermore, in the vicinity of the field 421, a field 422 used to input the amount in the case of the fixed amount purchase and fields 423 and 424 used to input the range in the case of the range designation purchase are provided. A field 425 is used to specify whether a purchase

is effected even if the available amount is less than the desired amount. Furthermore, on the screen, two icons, i.e., a button 431 for registration into the rule list, and a button 432 for suspending the rule generation/correction on the way, are displayed.

In the case where a rule is to be generated/corrected, it can be conducted by inputting the price condition to the fields 411 through 413, inputting the amount condition to the fields 421 through 425, and pressing a registration button 431. In the case where a rule is to be suspended on the way, the suspension button 432 is pressed.

In the case where the specified range purchase is specified in the amount condition and the upper amount is not prescribed, i.e., in the case where the upper limit should be set equal to the remaining quantity, only the lower limit is inputted to the field 423. In the case where the lower limit is not to be prescribed, only the upper limit is inputted to the field 424.

A generated rule can be deleted by using the deletion button 323. The generated rules are evaluated in the order shown in the rule list 313. For changing their priorities, therefore, priority change buttons 318 and 319 are used.

By pressing the transmission button 326, auction ordering information is transmitted to the electronic marketplace server 11 and participation in the auction is registered. The auction ordering information thus transmitted contains at least the rule list 313 and a flag added thereto to specify whether the purchasing person participates in the auction once a successful bid has been conducted. The transmission of the auction ordering information at this time can be implemented by using the function of the known browser, for example, such as Netscape Navigator 3.0 produced by Netscape, Inc. In the case where a registration number, registration time, and the like are transmitted from the electronic marketplace server 11 after completion of the registration, they may be displayed on the output device 123 or they may be stored in the storage device 124. The registration number transmitted from the electronic marketplace server 11 may be used as an inquiry key for the electronic marketplace server 11 in the future. In the case where the participation in the auction is to be passed up, the suspension button 327 is pressed and the auction ordering information creation is terminated.

By a registration situation screen 51 shown in FIG. 6, the purchasing person client 12 procures the auction registration situation from the electronic marketplace server 11. On the registration situation screen 51, an ordering product list 511 is displayed. The ordering product list 511 is a list of the products ordered by the purchasing person. On the screen, icons of an auction ordering information display/correction button 512, an order suspension button 513, an auction result display button 514, and a button 515 for closing the registration situation screen 51 are also displayed. In the ordering product list 511, a list of ordering products is displayed. In the ordering product list 511, the date and hour of registration of auction ordering information, the subject product number of the auction ordering information, and a flag representing the auction completion state are shown to be displayed. However, other detailed information may be displayed. As for such an ordering situation, auction ordering information given from another purchasing person may be displayed.

In the case where the auction ordering information is to be displayed/corrected, a subject ordering product is selected out of the ordering product list 511 and the display/correction button 512 is pressed. Thereupon, auction ordering information is displayed in the auction condition input

editor 31. In the case where the auction ordering information is to be corrected, new auction ordering information is generated on the basis of the above described method and registered in the electronic marketplace server 11. In the case where ordering is to be suspended, a subject ordering product is selected out of the ordering product list 511 and the suspension button 513 is pressed.

In the case where the auction result is to be displayed, a subject ordering product is selected out of the ordering product list 511 and the result display button 514 is pressed. Thereupon, an auction result screen 61 shown in FIG. 7 appears. The auction result screen 61 includes a successful bid result 611, a transaction process 612, a rule result 613 contained in the auction ordering information, and a button 614 for closing the screen.

In the successful bid result 611, a successful bid result concerning the purchasing person and the entire successful bid result are included. The entire successful bid result includes hammer prices and the quantities of the successful bids in the order of success bid.

In the transaction process 612, the price, amount and situation are included. The situation indicates the situation at that time. As the situation, "there are no desiring persons", "successful bidder determined", "competition occurrence and price rise", "competition continuation and price rise", or "competition vanished and successful bidder determined", for example, is displayed. The message "there are no desiring persons" indicates that there are no purchasing persons. The message "successful bidder determined" indicates that there are purchasing persons and a successful bidder has been determined. The message "competition occurrence and price rise" indicates the occurrence of a competition and a price rise caused to the competition. The message "competition continuation and price rise" indicates that the competition is not eliminated and the price has risen for competition elimination. And the message "competition vanished and successful bidder determined" indicates the competition elimination, the determination of a successful bidder, and a price rise for competition elimination. In the case where a successful bid has been conducted, the successful bid amount is included.

In the rule results 613, the behavior of rules contained in the auction ordering information at the time of the auction are included. In the case where a successful bid has been conducted, the behavior at the time of the auction includes the hammer price and the successful bid amount. In the case where a successful bid has not been conducted due to a competition, the behavior at the time of the auction includes failed prices. In the case where a rule has not been used, the fact is included in the behavior.

Monitoring of the auction ordering information in the electronic marketplace server 11 will now be described. In FIG. 8, an electronic marketplace monitor 71 is shown. In the electronic marketplace monitor 71, a monitored product number 711, a registered purchasing person list 712, number of registrations 713, a message column 714, a product change button 715, and an end button 716 are included.

In the case where the monitored product is to be changed, the product change button 715 is pressed and the change is conducted by using a product selection screen 81 shown in FIG. 9. On the product selection screen 81, a registered product number list 811, an OK button 812, and a cancel button 813 are displayed. As for the change of the monitored product, a product to be monitored is selected out of the product number list 811 and the OK button 812 is pressed. In the case where the change is to be suspended, the cancel button 813 is pressed.

For each of purchasing persons who registered the auction ordering information, the registered purchasing person list 712 includes a registration number 7121, a purchasing person ID 7122, transmission time 7123 of auction ordering information from the purchasing person client 12, and reception time 7124 of the auction ordering information in the electronic marketplace server 11. In the number of registrations 713, the current number of registrations of the auction ordering information is displayed. In the case where something should happen during monitoring, a predetermined message depending thereupon is displayed in a message 714.

In the case where auction ordering information of a product to be monitored has been received during monitoring of the auction ordering information, information 719 concerning the purchasing person who transmitted the newly received auction ordering information is displayed in the registered purchasing person list 712 as shown in FIG. 10. At the same time, a message indicating that the auction ordering information has newly arrived is displayed in the message column 714. At this time, an operation for calling the attention of an operator, such as a flashing display of information concerning the newly registered purchasing person, or a sound indication, may be conducted simultaneously.

Execution of an auction and monitoring of the execution will now be described. FIG. 11 shows an auction monitor 91, which is displayed on the output device 113 of the electronic market server 11 while an auction is being conducted. The auction monitor 91 includes a product number under auction 911, a list of purchasing persons who desire purchase 912, a number of purchasing persons who desire purchase 913, a remaining number of products 914, a current price 915, a field for visually displaying the current price 916, and a transaction process 917. As the field 916, a circular shaped gauge is used in FIG. 11.

For each purchasing person on the list of purchasing persons who desire purchase 912 includes a registration number 9121, a purchasing person state 9122, a purchasing person ID 9123, a desired amount 9124, and an allocated amount 9125. In the purchasing person state 9122, a state such as "desire" representing a desire for purchase, "abandon" representing abandonment of the purchase, or "successful bid" representing that a successful bid has been determined is displayed.

The price 915 and the field 916 are moved in response to a price change so as to be interlocked with each other. The gauge of the field 916 is rotated in the counterclockwise direction whenever the price rises and rotated in the clockwise direction whenever the price falls. A price may be plotted on each indication point of the field 916 for more legibility. By doing so, the person watching the auction monitor 91 can judge visually with more ease whether the price has risen or fallen.

The transaction process 917 includes the contents contained in the transaction process 612 shown on the auction result screen 61 in the purchasing person client 12. Here, the purchasing person ID who has conducted a successful bid is also included. Furthermore, a message for an operator monitoring the auction may also be included.

Examples of the auction monitor 91 in the middle of the auction are shown in FIGS. 11, 12 and 13.

In FIG. 11, registration numbers 1, 3 and 4, i.e., purchasing persons teramura, kosaka, and m-mori, desire the purchase when the price has reached ¥90. The desired amounts are 150, 60 and 80, respectively. In the transaction process 917, the fact that a competition has occurred at ¥90 is displayed.

From the state of FIG. 11, the price rises and the price has reached ¥93 as shown in FIG. 12. The current price 915 becomes 93, and the field 916 also rises according to it. At the time point of ¥93, the purchasing persons teramura and m-mori having the register numbers 1 and 4 give up the purchase. As a result, the competition vanishes. In the transaction process 917, the fact that the competition has vanished at ¥93 is displayed. When the price is rising, the background color of the field 916 may be changed or a sound may be produced in order to emphasize the fact that the price is rising.

The competition has vanished as shown in FIG. 12, and a successful bidder has been determined as shown in FIG. 13. The purchasing person kosaka of the registration number 3 is a successful bidder. In the transaction process 917, the fact that kosaka has conducted a successful bid for 60 boxes at ¥93 is displayed. The remaining quantity 914 has changed from 200 to 140.

The display of the auction ordering situation (FIG. 6), monitoring of the ordering situation (FIGS. 8, 9 and 10), and the display of the auction monitor (FIGS. 11, 12 and 13) are executed at any time according to a request from the terminal of the electronic marketplace server 11.

The auction method of the present invention will now be described in further detail. FIG. 1 is a processing flow of the entire automatic auction executed by the electronic marketplace server 11. Here, an auction is conducted on the basis of "method of descending price." In the "method of descending price," the auction is conducted while the price is being lowered.

First of all, an initial price is set (step 1101). This may be set equal to a calculable value such as a fixed value times the average successful bid price of the previous day, a fixed value times the average successful bid price of the past, or a fixed value times the average successful bid price of the same variety of another marketplace. In any case, a method should be chosen that eliminates any suspicion of price manipulation conducted by an auctioneer so that fairness can be maintained.

In the case where this price has become lower than the lowest price predetermined by the shipping person client 13, the auction is finished. In the case where the price is not lower than the lowest price, the processing proceeds to step 1104 (step 1103). At step 1104, a purchasing person desiring the purchase is searched by using a purchase desiring purchasing person search routine. If there is a purchase desiring purchasing person, processing proceeds to step 1106. If there is not a purchase desiring purchasing person, then the price is lowered by a predetermined fixed value (step 1102), and thereafter processing proceeds to step 1103 (step 1105).

At step 1106, it is determined whether there is a competitive state by using a competitive state judging routine. In the case where there is not a competitive state, processing proceeds to step 1109 (step 1107). In the case of a competitive state, the competitive state vanishes by using a competition vanishing routine (step 1108). Subsequently, products are allocated among purchasing persons desiring the purchase by using a product allocation routine (step 1109). If there are remaining products, the processing proceeds to the step 1103. If there are no products, the auction is finished (step 1110).

The processing procedure of the purchase desiring purchasing person search routine (step 1104 of FIG. 1) will now be described by referring to FIG. 14. In the case of the competitive state, operations as far as step 1206 are repeated for all purchasing persons desiring the purchase. In the case

of a noncompetitive state, operations as far as the step 1206 are repeated for all registered purchasing persons except purchasing persons who did not participate in the auction after conducting a successful bid once and who conducted a successful bid once (step 1201).

For all rules held by a subject purchasing person excepting rules fired once, operations as far as step 1204 are repeated (step 1202). Here, "firing" means participating in the auction, and means the case where the set price of the auction coincides with the desired auction price or the case where the set price of the auction is contained in the highest possible price for the desired auction price.

If the current price is greater than the sum of the specified price of the subject rule and the highest possible price in competition in the competitive state and if the current price is greater than the specified price of the subject rule in the noncompetitive state, the processing proceeds to step 1204. Otherwise, the processing proceeds to step 1207 (step 1203).

If the current price is greater than the specified price of the subject rule, then the step 1203 is repeated until all rules held by the purchasing person excepting fired rules are finished (step 1204). If the repetitive processing is finished, the subject purchasing person is excluded from purchase desiring purchasing persons (step 1205). Until the loop condition of the step 1201 is finished, the processing is repeated (step 1206).

If the current price is less than the specified price of the subject rule at the step 1203, a minimum desired amount and a maximum desired amount are set on the basis of the subject rule. In other words, if the amount specification of the subject rule is all amount purchase, the minimum desired amount is set equal to 0 and the maximum desired amount is set equal to the remaining quantity. If the amount specification of the subject rule is fixed amount purchase, the minimum desired amount is set equal to a specified amount and the maximum desired amount is set equal to a specified amount. If the amount specification of the subject rule is range designation purchase and its upper limit value is not prescribed, then the minimum desired amount is set equal to its lower limit value and the maximum desired amount is set equal to the remaining quantity. If the amount specification of the subject rule is range designation purchase and its lower limit value is not prescribed, then the minimum desired amount is set equal to 0 and the maximum desired amount is set equal to its upper limit value. If the amount specification of the subject rule is range designation purchase and both its upper limit value and its lower limit value are not prescribed, then the minimum desired amount is set equal to the lower limit value and the maximum desired amount is set equal to the upper limit value (step 1207).

It is determined whether the remaining quantity is less than the minimum desired amount set at the step 1207. If the remaining quantity is less than the minimum desired amount, then the processing proceeds to the step 1204. If the remaining quantity is greater than the minimum desired amount, then the processing proceeds to step 1209 (step 1208). The subject purchasing person is set to a purchase desiring purchasing person, and the firing rule is set to a subject rule (step 1209).

The detailed processing procedure of the competitive state judging routine (step 1106 of FIG. 1) will now be described by referring to FIG. 15. First of all, the sum total (sum total 1) of the minimum desired amounts of the purchasing persons desiring the purchase is calculated (step 1301). The minimum desired amount is a value set at the step 1207 of FIG. 14. If the remaining quantity is less than the sum of the sum total 1 derived at the step 1301 and the number of

purchase desiring purchasing persons each having a minimum desired amount equal to zero, then the processing proceeds to step 1303. Otherwise, the state is judged to be an allocatable state and the judging routine is finished (step 1302).

Among the purchase desiring purchasing persons each having a nonzero desired amount, some persons do not purchase according to the amount condition of the firing rule if the amount is less than the minimum desired amount. The sum total (sum total 1) of the minimum desired amounts of such purchase desiring purchasing persons is calculated (step 1303).

If the remaining quantity is less than the sum of the sum total 2 derived at the step 1303, the number of purchase desiring purchasing persons each having a minimum desired amount equal to zero, and the number of purchase desiring purchasing persons who are included in the purchase desiring purchasing persons each having a nonzero minimum desired amount and who purchase even if the amount is less than the minimum desired amount according to the amount condition of the firing rule, then the state is judged to be a competitive state and the judging routine is finished. Otherwise, the processing proceeds to step 1305 (step 1304).

For the purchase desiring purchasing persons who are included in the purchase desiring purchasing persons each having a nonzero minimum desired amount and who purchase even if the amount is less than the minimum desired amount according to the amount condition of the firing rule, the minimum desired amount is set equal to 0. The state is judged to be an allocatable state, and the judging routine is finished (step 1305).

The detailed processing procedure of the competition vanishing routine (step 1108 of FIG. 1) will now be described by referring to FIG. 16. In the conventional auction method, the auction is conducted by gradually lowering the price. Once a competitive state is brought about, however, the auction is conducted by gradually raising the price and consequently narrowing down the purchasing persons in the present invention.

If a competition has occurred, the price is raised by a predetermined value (step 1401). If a resultant price has exceeded a predetermined fixed reference value, the processing proceeds to step 1407. If the resultant price has not exceeded the reference value, the processing proceeds to step 1403 (step 1402).

By using the purchase desiring purchasing person search routine 1104 shown in FIG. 14, a purchase desiring purchasing person is searched for (step 1403). If there is a purchase desiring purchasing person, the processing proceeds to step 1405. If there is not a purchase desiring purchasing person, the processing proceeds to step 1407 (step 1404). Subsequently, by using the competitive state judging routine 1106 of FIG. 15, it is determined whether the current state is a competitive state (step 1405).

In the case of the competitive state, the processing proceeds to step 1401. If the current state is not a competitive state, the processing is finished (step 1406). In the case where the processing has proceeded to the step 1407, the immediately preceding price state is restored. In this state, returning the state concerning the purchase desiring purchasing person to the original state is also included.

The processing flow of the product allocation routine (step 1109 of FIG. 1) will now be described by referring to FIGS. 17 and 18. In the ensuing processing, the minimum desired amount and the maximum desired amount are set at the step 1207 of the purchase desiring purchasing person search routine shown in FIG. 14.

## 13

For all of the purchase desiring purchasing persons, the processing as far as step 1507 is repeated in the order of decreasing minimum desired amount, and in the order of time of registration of the auction ordering information to the electronic marketplace server 11 in the case where the minimum desired amounts are the same (step 1501). If the minimum desired amount of the subject purchasing person is not 0, then the processing proceeds to step 1503. If the minimum desired amount of the subject purchasing person is 0, then the processing proceeds to step 1506 (step 1502). If the remaining quantity is at least the minimum desired amount of the subject purchasing person, then the processing proceeds to step 1504. If the remaining quantity is less than the minimum desired amount of the subject purchasing person, then the processing proceeds to step 1508 (step 1503).

The minimum desired amount is allotted to the subject purchasing person, and the remaining quantity is decreased by the minimum desired amount (step 1504). If the amount specification of the firing rule of the subject purchasing person is not the fixed amount purchase, then the processing proceeds to the step 1506. In the case of the fixed amount purchase, the processing proceeds to the step 1507 (step 1505). The subject purchasing person is set to a variable amount purchasing person (step 1506).

Until the above described condition of the loop 1 is finished, the processing beginning from the step 1501 is repeated (step 1507). At step 1508, the processing proceeds to step 1509, in the case where the subject purchasing person purchases according to the firing rule of the subject purchasing person even if the amount is less than the desired amount. In the case where the subject purchasing person does not purchase, the processing proceeds to step 1507. All of the remaining quantity is allotted to the subject purchasing person (step 1509), and the processing is finished.

If at the step 1507 there is a remaining product and there is a variable amount purchasing person, then the processing proceeds to step 1511. If there is not a remaining product or there is not a variable amount purchasing person, then the processing is finished (step 1510).

As a loop 2, processing as far as step 1516 is repeated for all of the variable amount purchasing persons (step 1511). The amount allotted to the subject purchasing person is increased by one (step 1512). If the amount allotted to the subject purchasing person is equal to the maximum desired amount, the processing proceeds to step 1514. If the amount allotted to the subject purchasing person is not equal to the maximum desired amount, the processing proceeds to step 1515 (step 1513).

At step 1514, the subject purchasing person is not set to a variable amount purchasing person. If there is a remaining product, the processing proceeds to step 1516. Otherwise, the processing is finished (step 1515). At step 1516, the processing is repeated until the processing is finished for all of the variable amount purchasing persons.

Heretofore, detailed embodiments have been described. The concrete automatic auction method will now be described by referring to FIGS. 19 and 20.

FIG. 19 shows a condition 2010 in the automatic auction. FIG. 20 shows "registered purchasing persons and their auction ordering information" 2020. In the auction condition 2010, the quantity, initial price, increment of descending price, lowest price, increment of ascending price in competition, and highest ascending price are included. For each of the registered purchasing persons, the "registered purchasing persons and their auction ordering information" 2020 includes an auction rule and a flag indicating whether

## 14

the registered purchasing person participates in the auction after the person has conducted a successful bid once.

On the basis of the conditions included in the auction condition 2010, the electronic marketplace server 11 conducts an auction by using the "registered purchasing persons and their auction ordering information" 2020. Hereafter, contents of the operation will be described by referring to processing for each price.

¥100 to ¥96 (1)

From ¥100, the price is lowered by the predetermined increment of descending price (¥1). Even when the price has been lowered to ¥96, there are no purchasing persons desiring the purchase. Therefore, the price is further lowered.

¥95 (2)

A rule 2021 of a purchasing person A is fired. In other words, the purchasing person A appears as the purchase desiring purchasing person who coincides with the price condition (¥95). While the remaining quantity is 200 boxes, the desired quantity of the purchasing person A is 60 boxes. At this time, therefore, a competition does not occur. Accordingly, the desired amount of 60 boxes is allotted to the purchasing person A, and the remaining quantity is set to 140 boxes. As for the auction reopening price, the successful bid price ¥95, a price ¥94 next to the successful bid price, or a price raised by a constant ratio may be used. It is now assumed that the auction is reopened with the successful bid price.

¥95 to ¥91 (3)

The price is lowered by the predetermined increment of descending price (¥1). Even when the price has been lowered to ¥91, there are no purchasing persons desiring the purchase. Therefore, the price is further lowered. The rule 2021 of the purchasing person A does not become the subject of the evaluation, because its transaction has already been settled.

¥90 (4)

A rule 2022 of a purchasing person B and a rule 2023 of a purchasing person C are fired. As the purchase desiring purchasing person, the purchasing person B and the purchasing person C appear. While the remaining quantity is 140 boxes, the desired quantities are 100 boxes and 80 boxes, respectively. Since the total desired quantity is thus 180 boxes, a competition occurs. By raising the price by the predetermined increment of ascending price in competition (¥1), therefore, the competition is eliminated.

¥91 and ¥92 (5)

The highest possible price in competition is ¥2 in the rule 2022 of the purchasing person B. The highest possible price in competition is ¥4 in the rule 2023 of the purchasing person C. Even if the price is raised to ¥91, and then ¥92, therefore, both the purchasing person B and the purchasing person C desire the purchase. As a result, the competition does not vanish, and the price is further raised.

¥93 (6)

The raised price exceeds the highest possible price in competition (+¥2) in the rule 2022 of the purchasing person



B. Therefore, the purchasing person B gives up the purchase, and the competition is vanished. As for the purchasing person C, the raised price is within the highest price in competition (+¥4) in the rule 2023 of the purchasing person C. At the price within the range of purchase desire, therefore, the transaction is settled. As a result, the desired quantity of 80 boxes is allotted to the purchasing person C, and the remaining quantity becomes 60 boxes.

¥93 to ¥89

Due to the competitive state, the price was raised once. Since the competition has been vanished, an auction is conducted again with the remaining quantity. At the reopening price ¥93, there are no purchasing persons desiring the purchase. Therefore, the price is lowered by the predetermined increment of descending price (¥1). When the price is lowered to ¥90, it coincides with the price specified by the purchasing person B. Since the remaining quantity is 60 boxes, however, it does not coincide with the purchase condition of the purchasing person B. Therefore, the transaction with the purchasing person B is not settled. Accordingly, the price is further lowered.

¥88

Since there are no purchasing persons desiring the purchase at ¥89, the price is further lowered. Thereupon, a rule 2024 of a purchasing person D is fired, and the purchasing person D appears as the purchasing person desiring the purchase. While the remaining quantity is 60 boxes at this time, the minimum desired amount is 50 boxes. Therefore, a competition is not caused. The minimum desired amount of 50 boxes is first allotted to the purchasing person D, and the purchasing person D is set as the variable amount purchasing person. Since the remaining quantity is 10 boxes, the remaining quantity of 10 boxes is allotted to the purchasing person D which is the variable amount purchasing person. As a result, the purchasing person D purchases 60 boxes. Accordingly, the remaining quantity becomes 0 boxes, and the auction is finished.

In the present embodiment, the purchasing person client 12 registers rules concerning the auction into the electronic marketplace server 11 as the auction ordering information. The electronic marketplace server 11 conducts the auction on the basis of the auction ordering information. Therefore, it becomes unnecessary for the purchasing person client 12, i.e., the bidder, to stay before the auction terminal at the time of the auction.

By making the rule include the purchase conditions, it becomes possible to automatically and flexibly cope with the situation change at the time of the auction. Thus the on-line and real time properties are not necessarily required. As a result, auction transactions become possible on an open network on which it is difficult to assure the on-line and real time properties.

A countermeasure to the security will now be described. For implementing a safe auction, it becomes necessary to prevent a malicious third party from participating in the transaction and keep data concerning the auction secret (i.e., prevent wiretapping and falsifying). For this purpose, the following methods are used.

First of all, individual authentication is conducted by sending the purchasing person ID and the password from the purchasing person client 12 to the electronic marketplace server 11 at least one timing instant such as at the time of connection to the electronic marketplace server 11, before the procurement of the product information, before the

transmission of the auction ordering information, before the procurement of the auction ordering situation, before the modification of the auction ordering information, before suspension of the auction ordering, and before the procurement of the auction result.

When a purchasing person client 12 is registered as a purchasing person of the electronic marketplace server 11, the purchasing person ID and the password of the purchasing person are sent via telephone, FAX, mail or the communication network 14.

Subsequently, encryption processing is effected for various kinds of information exchanged between the electronic marketplace server 11 and the purchasing person client 12. As for the encryption method used in the encryption processing, either of the public key encryption system (such as RSA) or the common key encryption system (such as DES (Data Encryption Standard)) may be used. As for the allocation of the encryption key, it is sent to a purchasing person client 12 via a storage medium such as an IC card or a floppy disk, or via the communication network 14, when the purchasing person client 12 has been registered as a purchasing person of the electronic marketplace server 11.

Owing to the countermeasures heretofore described, it becomes possible to prevent a third party who does not know the purchasing person ID and the password from participating in the transaction. Furthermore, it becomes possible to prevent a person having no encryption key from conducting wiretapping for data concerning the auction and falsifying the data concerning the auction.

As heretofore described in detail, the present invention solves the above described problems of the conventional technique and makes it unnecessary for bidders to stay before auction terminals at the time of auction. In addition, auction transactions become possible on an open network on which it is difficult to assure the on-line and real time properties. Thus the present invention brings about significant effects.

What is claimed is:

1. An auction method, comprising the following steps: receiving ordering information from remote bidders, the ordering information including a desired price, number of product purchases and a highest possible price for each remote bidder; and conducting an automated auction procedure whereby the desired prices included in said ordering information are compared to determine an initial highest product price; wherein, if two or more bidders have competing desired prices, a successful bidder is determined on the basis of the largest highest possible price included in said ordering information; but if no bidders have competing desired prices, a successful bidder is determined on the basis of the largest desired price included in said ordering information.
2. A method as claimed in claim 1, wherein participation of the remote bidders in the auction is effected by the steps of: displaying auction information to the remote bidders, said auction information being received by the remote bidders via an on-line circuit; each of the bidders selecting an auction subject specified by an operator out of displayed subjects; creating, for said selected subject, the auction ordering information including the desired price, number of product purchases, and the highest possible price in competition for the desired price; and transmitting said auction ordering information to an auctioneer terminal.



3. A method as claimed in claim 2, wherein for each selected subject, a flag specifying whether participation in the auction should be conducted after effecting a successful bid once is added to said auction ordering information and transmitted.

4. A method as claimed in claim 1, wherein said number of product purchases is specified by any one method selected from constant quantity designation, quantity range designation, and remaining quantity designation.

5. A method of claimed in claim 1, wherein a flag specifying whether a purchase should be conducted even if an available number of products for purchase is less than the desired number is included in the ordering information.

6. An auction method according to claim 5, wherein said number of product purchases is specified by using a constant quantity designation or a quantity range designation, and in said step (b), an auction issue is judged to be present if the available number of products is equal to or greater than a lower limit value in the case of the quantity range designation, and an auction issue is judged to be present if the available number of products is equal to or greater than a desired quantity in the case of the constant quantity designation.

7. A medium for storing a program for performing the method of claim 1, said program creating information for participating in the auction by using a computer, said program conducting processing, said processing comprising:

displaying information about an auction received via an on-line circuit;

selecting an auction subject specified by an operator out of displayed subjects;

creating, for said selected subject, auction ordering information including a desired price, number of product purchases, and a highest possible price in competition for the desired price; and

transmitting said auction ordering information to an auctioneer terminal via an on-line circuit.

8. An auction method, comprising the following steps: receiving ordering information from remote bidders, the ordering information including a desired price, number of product purchases and a highest possible price for each remote bidder; and

conducting an automated auction procedure whereby the desired prices included in said ordering information are compared to determine an initial highest product price and, if two or more bidders have competing desired prices, determining a successful bidder on the basis of the largest highest possible price included in said ordering information;

wherein the conducting step includes the following steps:

(a) setting an auction price;

(b) determining whether any auction ordering information exists with a desired price coinciding with said set auction price;

(c) if such auction ordering information exists in step (b) and the associated number of product purchases is satisfied for the auction ordering information, settling corresponding transactions, lowering said auction price, and then proceeding to said step (b), and

if such auction ordering information exists in the step (b) and the associated number of product purchases is not satisfied, raising said auction price and then proceeding to step (e);

(d) if no auction ordering information exists in the step (b), lowering the auction price, and proceeding to said step (b),

(e) determining whether a condition exists wherein the set auction price is greater than a sum of said desired price and said highest possible price in competition;

(f) if the condition of said step (e) is satisfied and the desired number of product purchases is satisfied, settling corresponding transactions and proceeding to said step (b), but

if the condition of said step (e) is not satisfied, raising the price and proceeding to said step (c); and

(g) conducting an auction by repeating processing of said steps (b) to (f) until all available products are exhausted or a fixed price is reached.

9. An auction method according to claim 8, wherein in said step (c), the desired number of product purchases is judged to be satisfied, if:

a sum total of numbers of purchases of fixed amount bidders each issuing auction ordering information with an amount condition specified by a constant quantity;

a sum total of lower limit values of desired ranges of first variable amount bidders who are bidders each issuing auction ordering information with an amount condition specified by a quantity range designation and who have nonzero lower limit values of desired ranges;

a number of second variable amount bidders who are bidders each issuing auction ordering information with an amount condition specified by a quantity range designation and who have zero lower limit values of desired ranges; and

a number of all amount bidders each issuing auction ordering information with an amount condition specified by a total quantity of available products is less than or equal to the available number of products.

10. An auction method according to claim 8, wherein said steps (c) and (f) comprise the steps of:

settling the transactions by allocating the available products to fixed amount bidders with the desired number of products in the auction ordering information being specified by a constant quantity, and allocating the available products to first variable amount bidders who are bidders each issuing auction ordering information with a desired number of product purchases specified by a quantity range designation and who have nonzero lower limit values of desired ranges; and

if products remain, and there are bidders issuing auction ordering information with a desired number of products specified by a total quantity, said first variable amount bidders, and second variable amount bidders who are bidders each issuing auction ordering information with an amount condition specified by a quantity range designation and who have zero lower limit values of desired ranges, allocating the product to the bidders so as not to exceed the desired number of products for said first variable amount bidders and said second variable amount bidders, and so as to allocate equal quantities to the bidders, to thereby settle the transactions.

11. An auction method according to claim 8, wherein if a rise of the price has exceeded a predetermined fixed value in the step (f), the transaction is settled by allocating the product to bidders in competition according to a fixed procedure.

12. An auction method according to claim 8, wherein if all bidders are removed from the auction as a result of a price rise, the transaction is settled by allocating the product to bidders in competition in an immediately preceding price state according to a fixed procedure.

13. An auction method according to claim 11, wherein said fixed procedure comprises allocating the available

19

products to fixed amount bidders with the desired number of products in the auction ordering information being specified by a constant quantity, and first variable amount bidders who are bidders each issuing auction ordering information with a desired number of product purchases specified by a quantity range designation and who have nonzero lower limit values of desired ranges, in a descending order of the constant quantity of the fixed amount bidders and a lower limit value of the range designation of said first variable amount bidders.

14. An auction method according to claim 13, wherein said fixed procedure further comprises allocating the product in the order of registration time of said auction ordering information if the constant quantities of said fixed amount bidders and the lower limit values of the range designations of said first variable amount bidders are the same.

15. An auction method, wherein the auction is conducted by an auctioneer terminal connected to one or more bidder terminals via a network, said method comprising the steps of:

receiving ordering information from remote bidders, the ordering information including a desired price, number of product purchases and a highest possible price for each remote bidder; and

conducting an automated auction procedure whereby the desired prices included in said ordering information are compared to determine an initial highest product price and, if two or more bidders have competing desired prices, determining a successful bidder on the basis of the largest highest possible price included in said ordering information;

wherein the conducting step includes the steps:

- a) inputting the auction ordering information from each of said bidder terminals;
- b) setting an initial price value from input means;
- c) in response to existence of auction ordering information containing a desired price coinciding with said set price, notifying said bidder terminal of transaction settlement and terminating the processing;

20

d) in response to nonexistence of auction ordering information containing a desired price coinciding with said set price, resetting said set price on the basis of an auction condition; and

e) executing said step c) or said step d) on the basis of said reset price.

16. An auction method, wherein the auction is conducted by an auctioneer terminal connected to one or more bidder terminals via a network, said automatic auction method comprising the steps of:

receiving ordering information from remote bidders, the ordering information including a desired price, number of product purchases and a highest possible price for each remote bidder; and

conducting an automated auction procedure whereby the desired prices included in said ordering information are compared to determine an initial highest product price and, if two or more bidders have competing desired prices, determining a successful bidder on the basis of the largest highest possible price included in said ordering information;

wherein said conducting step includes the steps of:

- a) inputting the auction ordering information from each of said bidder terminals;
- b) setting an initial price value from input means;
- c) lowering said set price until an auction issue appears;
- d) if there is at least one issue and a sum total of the number of product purchases for the auction issues is not satisfied, determining whether there is an auction issue coinciding in price by determining whether the price set said step c) is less than or equal to a sum of said desired price and said highest possible price in competition to be added; and
- e) raising the price set at said step c) until said desired quantity is satisfied.

\* \* \* \* \*